

# **Quicklub<sup>®</sup>**

## ***Pump Model 203 for direct current VDC***



10011327

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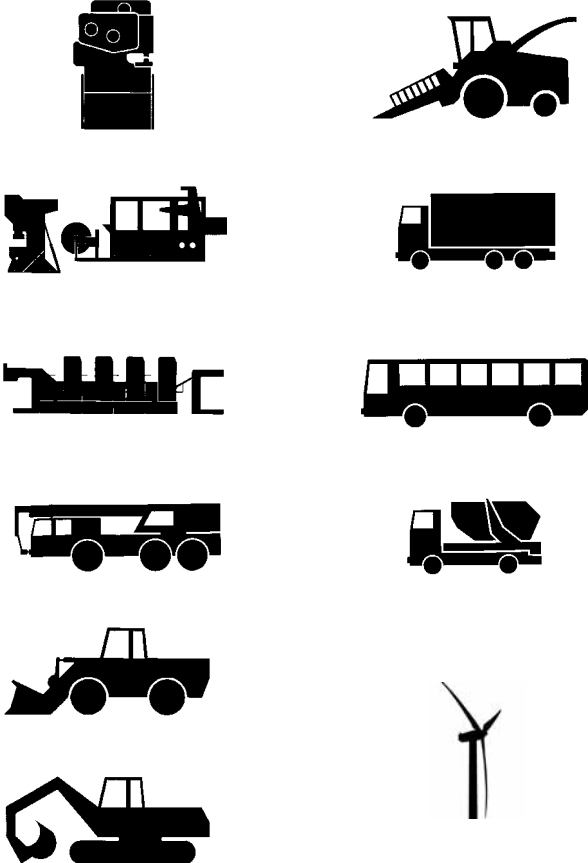
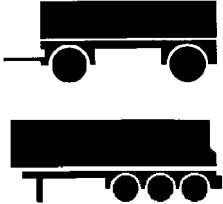


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## Fields of Applications of the Quicklub Progressive Central Lubrication Pumps

Industry - Machines - Commercial Vehicles - Building Machinery - Agricultural Machines - Wind Energy Plants	Pump Types
	<p><b>Pump</b> Quicklub 203</p> <p><b>Reservoir</b> 2 l - 2XN<sup>2)</sup>, 2XNFL<sup>2)</sup>, 2YN<sup>3)</sup>, 2XNBO<sup>1)</sup>, 2YNBO<sup>3)</sup>  4 l - 4XNBO<sup>1)</sup>, 4YNBO<sup>3)</sup>, 4XN<sup>2)</sup>, 4XL<sup>2)</sup>  8 l - 8XNBO<sup>1)</sup>, 8YNBO<sup>3)</sup>, 8XN<sup>2)</sup>, 8XL<sup>2)</sup>  15 l - 15XN<sup>1)</sup>, 15XL<sup>1)</sup>, 15XBF<sup>2)</sup>  <sup>1)</sup> Filling from the top or bottom  <sup>2)</sup> Filling only from the bottom  <sup>3)</sup> Filling only from the top  4l, 8l with lockable reservoir lid (option)</p> <p><b>Control</b> <b>Low-level control (option) possible with all re- servoir sizes</b>  Without control unit for 12/24 VDC or 230 VAC  Integrated control units ( V10-V13)<sup>4)</sup> for 12/24 VDC  Integrated control units ( V10-V13)<sup>4)</sup> for 230 VAC  Integrated control units with metering device moni- toring ( M 08 - M 23)<sup>4)</sup>  External control units  PSG 01 (Commercial vehicles)  PSG 02 (Industry)  PSG E2 (Industry &amp; Commercial vehicles)</p>
	<p><b>Control</b> H<sup>4)</sup></p>
	<p><b>Control</b> V10 - ADR<sup>4)</sup></p>
	<p><b>Control</b> H - ADR<sup>4)</sup></p>

<sup>4)</sup> See the respective model designation on the pump nameplate e.g. P203-2XN-1K6-24-1A1.10-**V10**

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**Further information can be found in the following manuals:**

- Technical Description Progressive Metering Devices for Grease and Oil, model SSV, SSV D and SSVM
- Printed Circuit Board 236-13862-1 - Model V10-V13
- Printed Circuit Board 236-13870-2 - Model M 08-M 15
- Printed Circuit Board 236-13870-2 - Model M 16-M 23
- Installation Instructions
- Parts Catalog
- Parts Catalog Pump 203
- Technical Description P203 DC
- Technical Description P203 AC
- Technical Description P203 with Follower Plate
- Lubricants
- External Printed Circuit Board 236-13894-1

## Introduction

### Explanation of Symbols Used




The following description standards are used in this manual:

#### Safety Instructions

Structure of safety instructions:

- Pictogram
- Signal word
- Danger text
  - Danger note
  - How to avoid danger

The following pictograms are used in this manual and are combined with the corresponding signal words:

		
1013A94	4273a00	6001a02
<b>ATTENTION</b>	<b>ATTENTION</b>	<b>NOTE</b>
<b>CAUTION</b>	<b>CAUTION</b>	<b>IMPORTANT</b>
<b>WARNING</b>	<b>WARNING</b>	

The signal words give the seriousness of danger if the following text is not observed:

<b>ATTENTION</b>	refers to faults or damages on machines.
<b>CAUTION</b>	refers to bad damages and possible injuries.
<b>WARNING</b>	refers to possible dangerous injuries.
<b>NOTE</b>	indicates improved operation of the device.
<b>IMPORTANT</b>	indicates special operating features of the device.

#### Example:



#### ATTENTION!

*When making use of other than the tested spare parts, serious damage may affect your device.*

*Therefore, for the operation of your device always use original spare parts made by Lincoln GmbH & Co. KG.*

Furthermore, you will find the following text symbols in this manual:

- Listing of applicable statements
  - Subpoint of applicable statements
- 1. Determination of the number or sequence of contents
- Procedural instruction

### User's Responsibility

To ensure the safe operation of the unit, the user is responsible for the following:

1. The pump / system shall be operated only for the intended use (see next chapter "Safety Instructions") and its design shall neither be modified nor transformed.
2. The pump / system shall be operated only if it is in a proper functioning condition and if it is operated in accordance with the maintenance requirements.
3. The operating personnel must be familiar with this Owner Manual and the safety instructions mentioned within and observe these carefully.

The correct installation and connection of tubes and hoses, if not specified by Lincoln GmbH & Co. KG, is the user's responsibility. Lincoln GmbH & Co. KG will gladly assist you with any questions pertaining to the installation.

### Environmental Protection

Waste (e.g. used oil, detergents, lubricants) must be disposed of in accordance with relevant environmental regulations.

### Service

The personnel responsible for the handling of the pump / system must be suitably qualified. If required, Lincoln GmbH & Co. KG offers you full service in the form of advice, on-site installation assistance, training, etc. We will be pleased to inform you about our possibilities to support you purposefully. In the event of inquiries pertaining to maintenance, repairs and spare parts, we require model specific data to enable us to clearly identify the components of your pump / system. Therefore, always indicate the part, model and series number of your pump / system.

### Glossary

Lubricating time	=	Operating time
Operating cycle	=	Lubrication cycle

## Safety Instructions

### Appropriate Use

- Use the 203 pump only for dispensing lubricants in centralized lubrication systems. The pump is designed for intermittent operation.

### Misuse

Any use of the 203 Pump that is not expressly mentioned in this Owner Manual will be regarded as misuse. If the 203 pumps used or operated in a different manner other than specified, any claim for warranty or liability will be null and void.



6001a02

#### NOTE

*If personal injury or material damage occurs as a result of inappropriate operation, e.g. if the safety instructions are ignored or resulting from an incorrect installation of the 203 pump, no claims or legal actions may be taken against Lincoln GmbH & Co. KG.*

### General Safety Instructions

- Quicklub centralized lubrication systems
  - are designed state-of-the-art.
  - can be assembled for safe operation.
  - must be filled regularly without air inclusions with clean lubricant recommended by the manufacturer.
- Incorrect use may result in bearing damage caused by poor or over-lubrication.
- Unauthorized modifications or changes to an installed system are not admissible. Any modification must be subject to prior consultation with the manufacturer of the lubrication system.

### Regulations for Prevention of Accidents

- To prevent accidents, observe all city, state and federal safety regulation of the country in which the product will be used.
  - Avoid the operation with
  - unapproved parts.
  - insufficient or contaminated lubricants.

### Disposal

- Dispose of used or contaminated lubricants as well as of parts that were in touch with lubricant according to the legal regulations pertaining to environmental protection. Make sure to observe the safety data sheets of the lubricants used.

### Exclusion of Liability

The manufacturer of the pump 203 will not accept any liability for damages:

- caused by a lack of lubricant due to an irregular refilling of the pump.
- caused by the use of contaminated lubricants.
- caused by the use of greases which are not or only conditionally pumpable in centralized lubrication systems (see pages 32 ff).
- caused by chemical or biological modifications of the lubricant used.
- caused by inadequate disposal of used or contaminated lubricants as well as of components that have been in touch with lubricant.
- caused by unauthorized modification of the system components.
- caused by the use of unapproved parts.

### Operation, Maintenance and Repair

- Repair should only be performed by authorized and instructed personnel who are familiar with the instructions.
- Lincoln Quicklub centralized lubrication systems
  - must be operated only with installed pressure relief valve.
  - must be refilled in regular intervals with clean lubricant recommended by the manufacturer without air entrapments.
  - operate automatically. However, a regular check (approx. every 2 days) should be made to ensure that lubricant is emerging from all lubrication points.



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#### CAUTION!

*Danger of squeezing in case of pumps to be filled from the reservoir top:  
**Never put your hand into the open reservoir while pump is running!***



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#### ATTENTION!

***Risk of bursting if the reservoir is overfilled!**  
When filling the reservoir by means of pumps with a large delivery volume do not exceed the max. filling mark.*

## Safety Instructions, continuation

### Installation

- Any safety equipment already fitted to the vehicle or the machine:
  - should not be modified or made ineffective;
  - should only be removed for the purpose of fitting the system;
  - must be replaced afterwards.
- Keep Quickclub centralized lubrication systems away from sources of heat. Adhere to the operating temperature.
- Use only original Lincoln spare parts (see Parts Catalog) or parts approved by Lincoln.
- Adhere to:
  - the installation instructions of the vehicle or machine manufacturer as regards all drilling and welding procedures.
  - the specified minimum distances between the bore holes and the upper/lower rim of the frame or between two bore holes.



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#### IMPORTANT

*Only for use in commercial vehicles.*



6001a02

#### IMPORTANT

- ➔ *Route supply lines professionally.*
- ➔ *Firmly bolt together pressurized components.*

1. The ADR Quickclub central lubrication pump complies with the design regulations of annex B of the act governing the road haulage of hazardous materials valid for Europe (ADR<sup>1)</sup>) and that valid for the Federal Republic of Germany (GGVS<sup>2)</sup>)
2. Moreover, the pump and its electrical equipment comply with the regulations of annex B.2 (ADR / GGVS regulations for electrical equipment) according to Rn 220000 in conjunction with the transport units mentioned in Rn 10251.
3. The ADR central lubrication pump is in conformity with the protection class IP 54.



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#### CAUTION!

*It is not allowed to use the pump in other potentially explosive fields.*

4. Install the ADR Quickclub 203 pump, the metering devices, lines and tube fittings as well as the electrical connection parts in accordance with the Installation Instructions. Use only original Lincoln parts.
5. After completion of the proper installation and commissioning, **the installation of the system must be certified by means of a stamp and signature of the specialized workshop or expert.** For this purpose, use the form attached to the Operating Instructions (pump 203).
6. If the pump and the installation do not comply with the construction regulations of ADR and GGVS, the type approval is no longer valid.
7. The Operating Instructions along with the certificate duly filled in must be added to the vehicle papers. It is to be submitted at the inspection in accordance with § 6, clause 4 GGVS.

## Installation

### Specifications for the installation of electric equipment for ADR-application in commercial vehicles

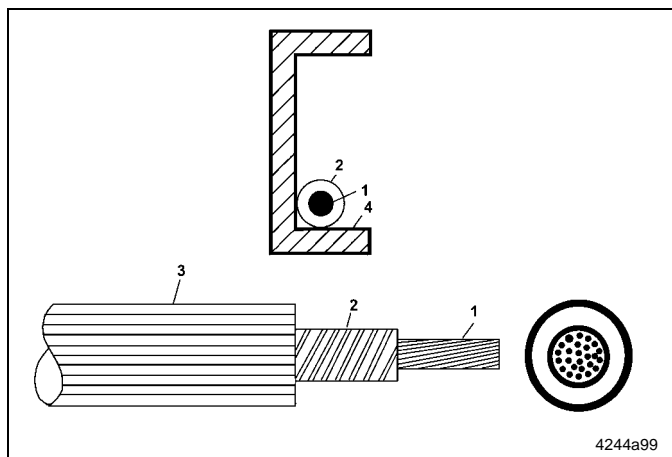


Fig. 1 Measures of protection for electric lines

- |                          |             |
|--------------------------|-------------|
| 1 - Conductor insulation | 3 - Frame   |
| 2 - Conductor            | 4 - Coating |

#### Lines

- must be fixed by means of clamps or strips to prevent them from rubbing, sagging or getting loose,
- must be protected from shocks, stone impact and heat,
- other than in a fixed installation, must be sufficiently flexible in spite of their covering.
- The electric circuits can optionally be interrupted by single- or double -pole disconnecting switches.
- In case of single-pole disconnecting switches, the negative conductor must be able to be interrupted.

#### For avoidance of short-circuits, please note the following:

- current return lines must be insulated
- they must be connected to the vehicle frame (MASS 31)
- below the driver's cab.
- housings and connectors must be of protection class IP 54
- according to DIN 40050
- plastic tubes must be of polyamide, tube coverings must be of polyurethane according to DIN VDE 0250 (only use original Lincoln ADR tubes).

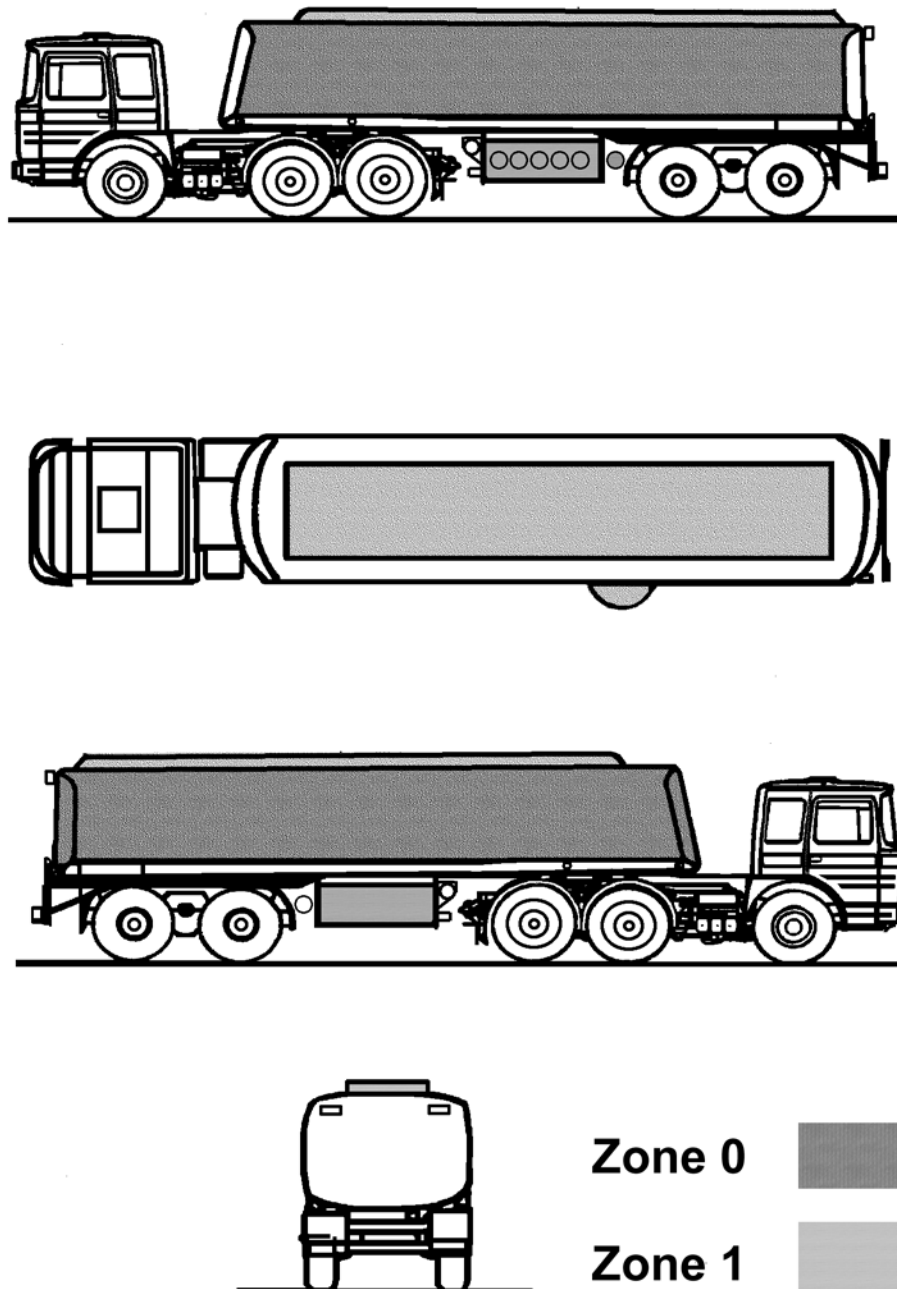
### Mounting of the Pump – Areas of Risk

- According to paragraph 9.7.8 of the ADR directive, vehicles with hazardous goods type FL are divided into zones, according to the EX prescriptions, see Fig. 2.
- These are the correspondences:
  - tank inside **zone 0**,
  - fitting cabinet **zone 1**
  - shut-off devices **zone 1**
  - venting devices **zone 1**
- Zone 2 is located around zones 0 and 1.
- The installation of the centralized lubrication system **is allowed outside of zones 0, 1 and 2, only**, whereby the extension is not determined in the ADR directive.



## Installation, continuation

### Mounting of the Pump – Areas of Risk, continuation



4332a01

Fig. 2 Areas of risk on vehicles with hazardous goods

## Pump Types



Fig. 3 The different types of pump 203

### Pumps 203

The 203 pumps differ from each other only in the design and reservoir size as well as in the type of the electric connection (different plugs with or without electric cable).

#### Reservoir sizes:

- 2 l transparent plastic reservoir
- 4 l transparent plastic reservoir
- 8 l transparent plastic reservoir

#### Electric connection

For the **industrial applications**, the pumps are only equipped with plugs.

The pumps model 203 used in **commercial vehicles** are equipped with a 10 m electric cable.

All other data such as:

- motor voltage
- version of the control unit
- remote control for triggering an additional lubrication cycle (2A1, 1A6, 1A7)
- design and number of pump elements
- design and number of pressure relief valves
- filling type
- use of return line connections
- low - level control (option)

can be learnt from the pump type designation code.

### Control unit models 203

The following control units can be used for the 203 pumps: (refer to the respective Technical Description)

- a) external control units
  - PSG 01
  - PSG 02 (Industry)
  - PSG E2 (Industry & Commercial vehicles)
- b) integrated control units
  - with adjustable pause and lubricating times, V10-V13<sup>1)</sup>
  - with adjustable pause and lubricating times, V10-V13<sup>1)</sup> for alternate current 120, 230 VAC, separate owner manual
  - with metering device monitoring (microprocessor control), **M 08 - M 23**<sup>1)</sup>
- c) integrated control unit (trailers)
  - with fixed time of availability (6 hours) and adjustable lubricating time, H<sup>1)</sup>

<sup>1)</sup> Refer to the designation on the pump nameplate.

Example: P203 -2XNBO - 1 K6 - 24 - 2A1.10 - V10

Also refer to the designation code on page 11.

## Identification Code - Pump Models 203

### Examples of model designations



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### NOTE

*Any pumps combinations other the above standard pumps can be composed and ordered in accordance with the valid model identification code.*

### Basic pump model for grease or oil

with 1-3 outlets and 12 VDC or 24 VDC motor

### Reservoir design

2 = 2 l transparent plastic reservoir

4 = 4 l transparent plastic reservoir

8 = 8 l transparent plastic reservoir

**X** = Reservoir for grease

**Y** = Reservoir for oil

**N** = Standard design

**L** = Low - level control

**without designation** = Standard reservoir (2 Litre)

**BO** = Filling from top

**FL** = Flat-type reservoir (2 Litre)

**BF** = Follower plate with high- and low-level control

### Pump elements

1-3 = Number of the use elements

**K 5** = Piston diameter = 5 mm

**K 6** = Piston diameter = 6 mm

**K 7** = Piston diameter = 7 mm

**KR** = Pump element, adjustable, piston-Ø = 7 mm

**B 7** = Piston diameter = 7 mm (output from K5)

**S 7** = Piston diameter = 7 mm (for greases containing silicone)

**C 7** = Piston diameter = 7 mm <sup>3)</sup>

<sup>3)</sup> C 7 = Designation of pump elements for supplying of paste for chisel (C = chisel), C 5 or C 6 on request

### Supply voltage

**12** = 12 VDC (square-type plug, bayonet plug, M12 plug)

**24** = 24 VDC (square-type plug, bayonet plug, M12 plug)

**AC** = 120-230 VAC (square-type plug) <sup>5)</sup>

### Number of electric connecting possibilities (on pump housing only)

**1A** = 1 connection DC, AC <sup>5)</sup>

- 1A: power supply (only with square-type plug) left bottom

**2A** = 2 connections <sup>4)</sup>

- 1A: power supply (only with square-type plug) left bottom, DC

- 2A: illuminated pushbutton / low-level control (right bottom) or

piston detector (right top) (see below 3A = 3 connections)

**3A** = 3 connections <sup>5)</sup>

- 1A: power supply (only with square-type plug) left bottom, AC <sup>5)</sup>

- 2A: illuminated pushbutton + low-level control (bayonet plug) left top

- 3A: piston detector (bayonet plug) right top

<sup>4)</sup> 1A: no connection provided for low-level control for oil

2A: with illuminated pushbutton only

<sup>5)</sup> Equipment described in separate documentation

### Type of connection

- 1 = cube-type plug, acc. to DIN 43650, type of construction A <sup>1)</sup>

- 2 = M12 plug

- 6 = bayonet plug, 7/5 pole, M08-M23

- 7 = bayonet plug, 7/6 pole, V10-13, V20-23

- 8 = PG - cable gland

### Connection outside the pump

- 00 = without socket-outlet, without cable

- 01 = with socket-outlet, without cable

- 10 = with 10 m cable

- 11 = with 10 m ADR cable

- 13 = with 10 m cable, 5 - wire (microprocessor M08 - M23)

- 15 = bayonet socket with 10 m cable, 7/5 core

- 16 = bayonet socket with 10 m cable, 7/6 core

### Control p. c. b. s. 12V / 24 V

V10 -V13 -with adjustable pause and operating time

V10 -V13 - ADR with adjustable pause and operating time <sup>2)</sup>

M 08 ...M 23\* - with microprocessor control (various

adjustments - see combinations of the jumper - positions) <sup>1)</sup>

H - for trailer or semitrailers

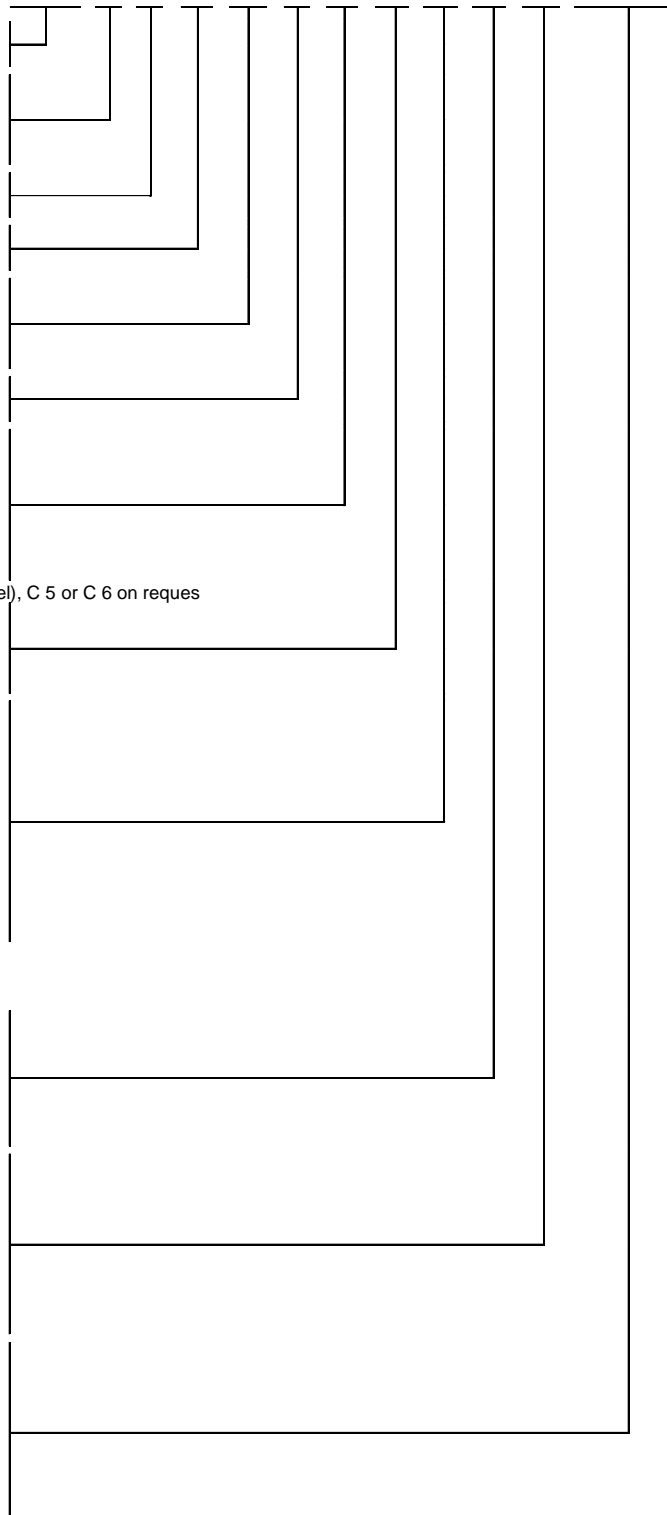
H - ADR for trailers and semitrailers <sup>2)</sup>

No designation: Pump without control p. c. b.

<sup>1)</sup> Not in conjunction with square-type plugs (type of connection 1)

<sup>2)</sup> For transport of hazard materials

P203 - 2 - X - N - 1 - K6 - 24 - 1A - 1. - 01 - V10  
P203 - 4 - X - L - 1 - K7 - 24 - 2A - 1. - 10 - V12  
P203 - 2 - X - N - 1 - K6 - 12 - 1A - 8. - 00  
P203 - 8 - X - L - 1 - K6 - 24 - 2A - 1. - 11 - V10- ADR  
P203 - 4 - Y - N - BO - 2 - K5 - 24 - 1A - 1. - 01  
P203 - 4 - X - L - BO - 1 - K6 - 24 - 3A - 2. - 13 - M08



## Description

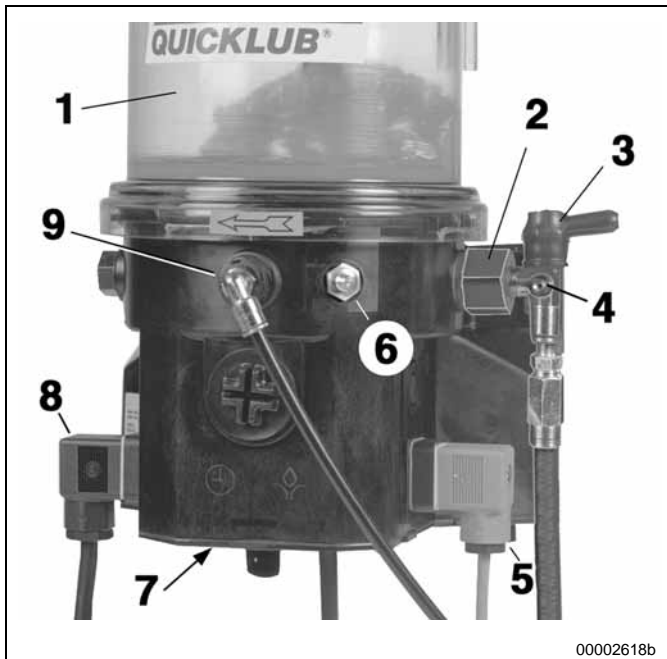


Fig. 4 Pump components

- |                                |                            |
|--------------------------------|----------------------------|
| 1 - Reservoir                  | 5 - Plug 2A1               |
| 2 - Pump element               | 6 - Filling nipple, pump   |
| 3 - Safety valve               | 7 - Printed circuit board  |
| 4 - Filling nipple, system     | 8 - Plug 1A1               |
| Emergency lubrication possible | 9 - Return line connection |

### The Quickclub 203 central lubrication pump

- is a compact multiline pump consisting of the following components:
  - Housing with integrated motor
  - Reservoir with stirring paddle
  - Printed circuit board
  - Pump element
  - Pressure relief valve
  - Filling nipple
  - Electrical connection parts
- can drive up to 3 pump elements
- operates according to operating cycles (pause and lubricating times)
- can be equipped with a low-level control
- can supply up to 100 lubrication points depending on the line lengths
- is designed for the automatic lubrication of the connected lubrication points
- is designed for the delivery of greases up to NLGI 2 at temperatures from - 25° C to 70° C or of mineral oils of at least 40 mm<sup>2</sup>/s (cST)
- can be used at low temperatures down to - 40° C.

During the operating time, the pump dispenses lubricant to the connected lubrication points via one or several metering devices.

### Low-level control (optional)

- The pump model 203 can be equipped with a low-level control.
- The following versions are available:
  - Low-level control in conjunction with printed circuit boards V10-V13 <sup>1)</sup>
  - Low-level control in conjunction with printed circuit board M08-M23 <sup>1)</sup>
  - Low-level control for pumps **without printed circuit board**.
- When the reservoir is empty, the signal lamp flashes, thus indicating the low level. Refer to the chapter Low-level control, page 18.

<sup>1)</sup> The designation indicates the version of the printed circuit board. It is part of the pump type designation code mentioned on the nameplate of each pump. Example: P203 - 2XN - 1K6 - 24 - 1A1.10 - V10



Fig. 5 Quickclub central lubrication pump, 2 l reservoir

## Mode of Operation

### Pump elements with fixed lubricant output

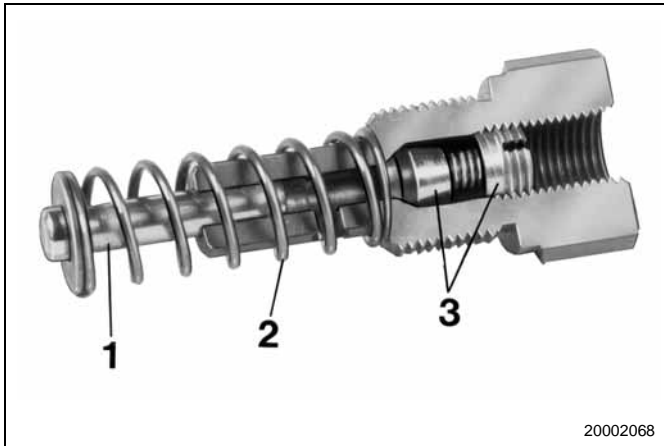


Fig. 6 Pump element

- 1 - Piston  
2 - Return spring  
3 - Check valve

- The electric motor drives the eccentric (pos. 1, Fig. 7 and 8).
  - During the lubricating time:
    - piston 2 sucks in lubricant from the reservoir, (see Fig. 7).
    - piston 2 dispenses the lubricant to the connected lubrication points via the metering device (see Fig. 8).
  - The following designs are available:
    - Piston diameter, K5 ..... 5 mm  
Lubricant output..... approx. 2 cm<sup>3</sup>/min
    - Piston diameter K6 (standard) ..... 6 mm  
Lubricant output..... approx. 2,8 cm<sup>3</sup>/min
    - Piston diameter, C7 ..... 7 mm  
Lubricant output ..... approx. 4 cm<sup>3</sup>/min
    - Piston diameter, B7 ..... 7 mm  
Lubricant output..... approx. 2 cm<sup>3</sup>/min
    - Piston diameter, K7, S7 <sup>1)</sup> ..... 7 mm  
Lubricant output ..... approx. 4 cm<sup>3</sup>/min
- <sup>1)</sup> Pump element S7 suitable for lubricants containing silicone

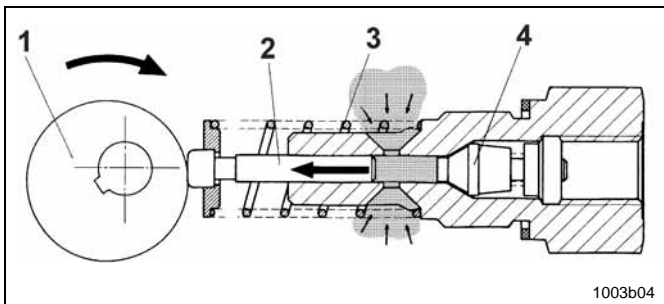


Fig. 7 The pump element sucks in lubricant

- 1 - Eccentric  
2 - Piston

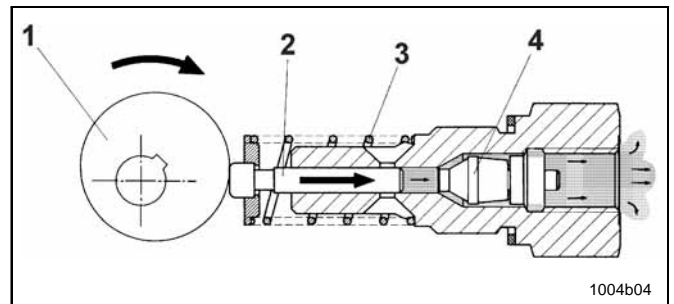


Fig. 8 The pump element dispenses lubricant

- 3 - Return spring  
4 - Check valve

### Pump element B7 with bypass check valve



Fig. 9 Pump element B7

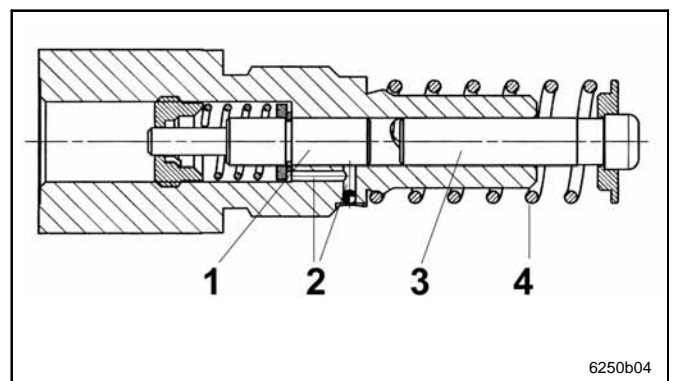


Fig. 10 Sectional diagram - pump element B7

- Pump element B7 suits especially applications in contaminated environments as the supplied lubricant is passing through a bypass bore (pos. 2, Fig. 10) on the check valve (pos. 1, Fig. 10).
- The output is 2 cm<sup>3</sup>/min.

## Mode of Operation, continuation

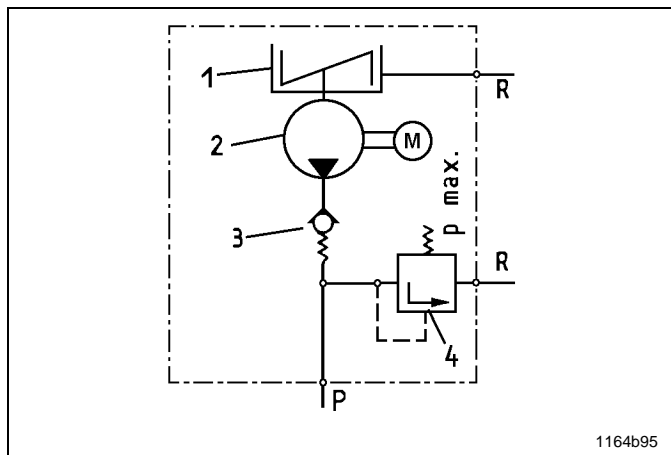


Fig. 11 Hydraulic diagram of the pump

### Check valve

- The check valve:
  - closes the pressure line during suction stroke
  - prevents the lubricant from flowing back to the housing or reservoir

- 1 - Reservoir with stirring paddle
- 2 - Pump
- 3 - Check valve, spring-loaded
- 4 - Pressure relief valve
- R - Return line
- p - Pressure line

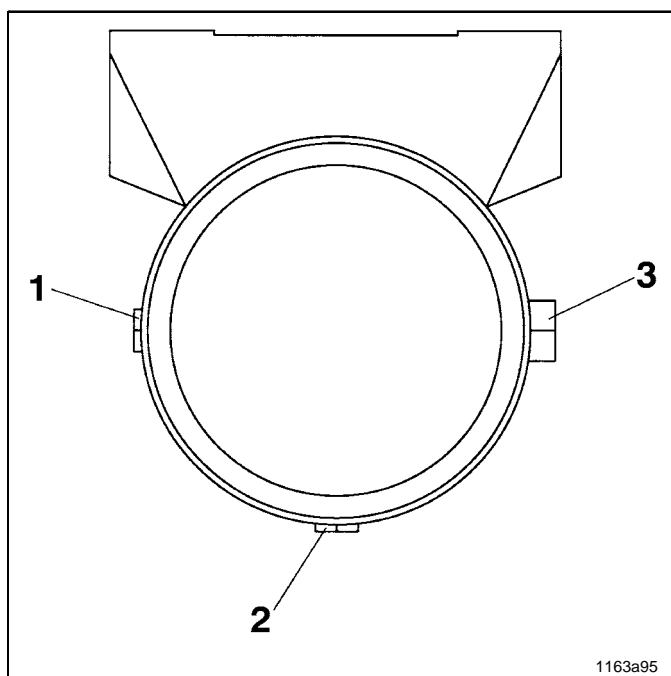


Fig. 12 Arrangement of the pump elements

### Arrangement of the pump elements

- If several pump elements are to be installed, the installation arrangement shown in Fig. 12 must be adhered to.
- If there is only one pump element, it can be installed in any position. Standard position is no. 3.
- If there are two elements, install one in position 3 and the other in position 1.

### Pump element with adjustable lubricant output

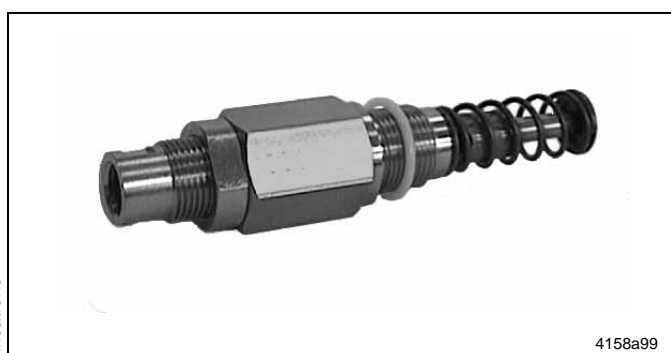


Fig. 13 Adjustable pumpelement

- The mode of operation (suction and supply phase) is the same as that of the pump elements with an invariable lubricant output.
- The lubricant outputs are adjustable from 0.04 to 0.18m<sup>3</sup>/stroke, or 0.7 to 3cm<sup>3</sup>/min.
- The pump elements are factory-adjusted to the maximum lubricant output; the adjusting dimensions "S" should be 29 ± 0.1 mm.



## Mode of Operation, continuation

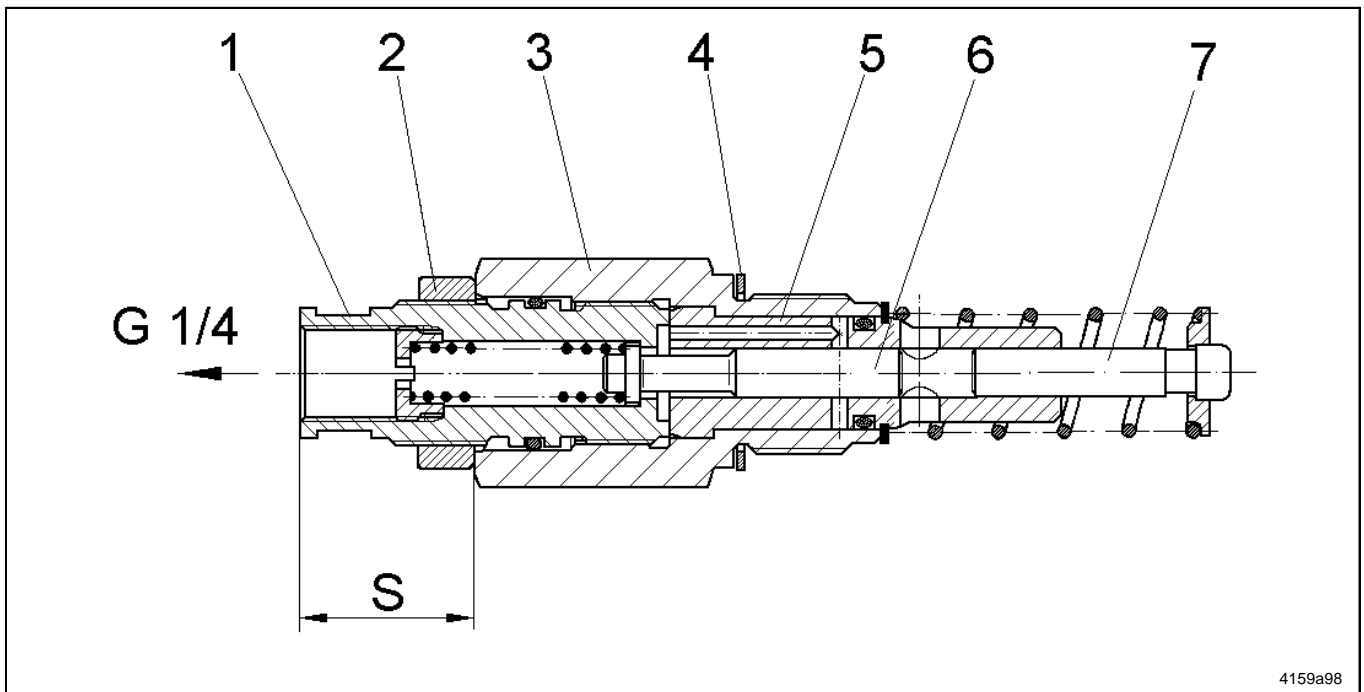


Fig. 14 Sectional view: adjustable element

- |  |                       |                     |
|--|-----------------------|---------------------|
| 1 - adjusting spindle SW 16<br>(with over flats) | 3 - pump element body | 6 - control piston  |
| 2 - counter nut SW 24                            | 4 - gasket            | 7 - delivery piston |
|  | 5 - pump cylinder     | S - dimension       |

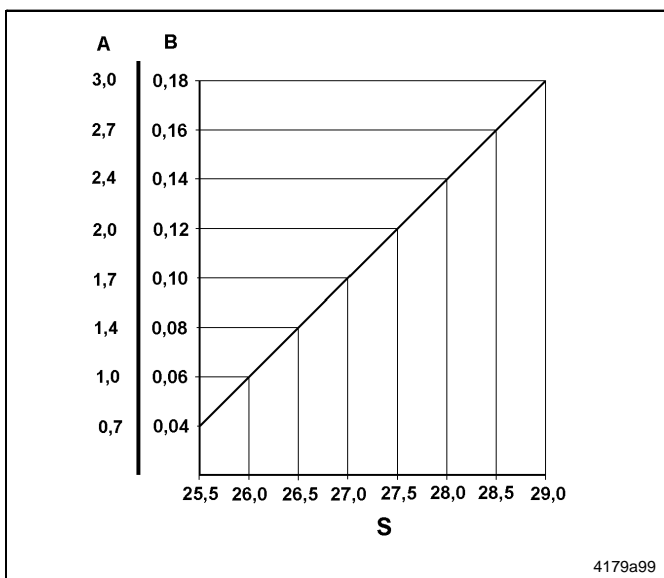


Fig. 15 Supply diagram

- A - Lubricant output cm³/min  
B - Lubricant output cm³/stroke  
S - Dimension

### Setting of adjustable pump elements

- Unscrew the coupling nut for fixing the safety valve.
- Loosen counter nut (pos. 2<sup>1)</sup>) while holding in position pump element body (pos. 3) by means of a second wrench.
- Change the position of the adjusting spindle (pos. 1) by means of a wrench.
- The dimension "S" (see Fig. 14) for the desired lubricant output can be ascertained by using the delivery diagram shown in Fig. 15.

### Retrofit adjustment of max. lubricant output



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#### NOTE

*In order to ensure that the lubricant output setting will be as exact as possible, first the actual dimensions "S" of the max. lubricant output must be ascertained as follows. The measured difference from the nominal value 29 must be considered for all other settings values (e.g. ± 0.1).*

- Unscrew the adjusting spindle (pos. 1<sup>1)</sup>) from the pump element body (pos. 3) until "S" is approx. 30 mm.
- Screw counter nut (2) onto stop collar of the adjusting spindle (pos. 1)
- Screw adjusting spindle (pos. 1) with counter nut (pos. 2) into pump element body (pos. 3) until stop.

<sup>1)</sup> All indications of positions refer to Fig. 14.

## Mode of Operation, continuation

### Adjusting of small lubricant outputs

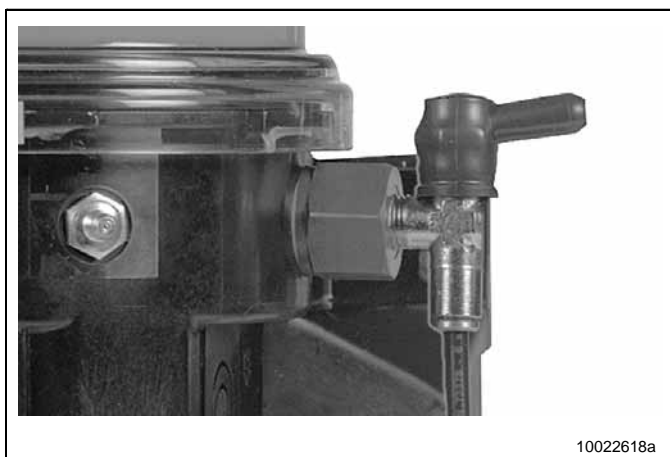
- Before the pump element can be adjusted to a small lubricant output, the dimension "S" for max lubricant output must be ascertained, and the difference from the nominal value 29 must be transferred to any desired settings between 25.5 ... 28,5.
- Dimension "S" must be adjusted to the desired value in accordance with the delivery diagramm (Fig. 15, page 15).



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#### NOTE

*At maximum steeing "S" is  $29 \pm 0.1$  mm.*



10022618a

Fig. 16 Pressure relief valve

### Pressure Relief Valve



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#### IMPORTANT

*Each pump element must be secured with a pressure limiting valve.*

- The pressure relief valve
  - limits the pressure build-up in the system
  - opens at an overpressure of 250 or 350 bar depending on the safety valve design.
- If lubricant is leaking at the pressure relief valve, this indicates that the system is malfunctioning.



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#### NOTE

*Between a malfunction (blockage) and the following fault indication (lubricant leakage; monitoring intermittent LED display on the control p.c.b., SPS) there may be a longer time delay.*

*The duration of the delay depends on the type and length of the lines, the type of lubricant, the ambient temperature and other influences.*

- Despite existing fault monitoring devices a regular visual and function control must be carried out on the lubrication system.



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Fig. 17 Pressure relief valve with grease return

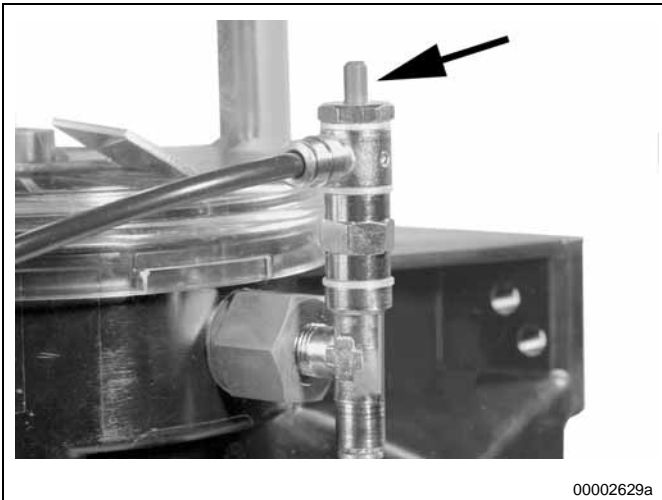
### Pressure relief valve with grease return (optional)

- If the system is blocked, grease will leak from the pressure relief valve. This grease quantity is returned to the reservoir.



## Mode of Operation, continuation

### Pressure relief valve with grease return, continuation

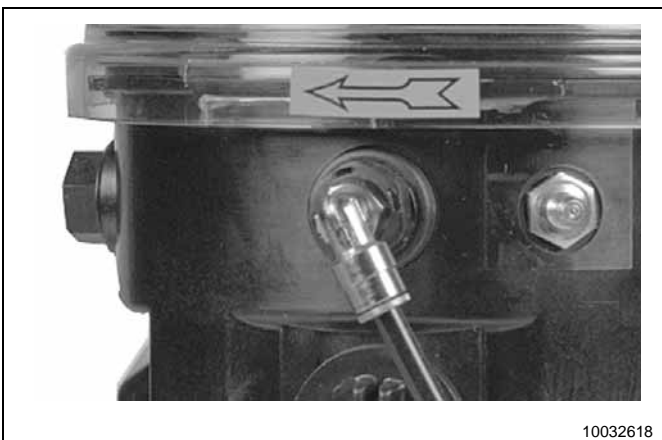


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Fig. 18 Fault indication in the case of a blockage

- In the case of a blockage in the system, the grease pushes out the red pin at the pressure relief valve, thus indicating that there is a fault.

### Return Line Connection

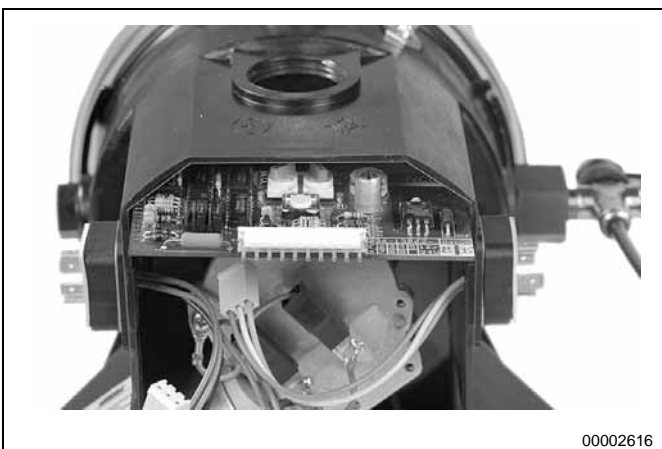


10032618

Fig. 19 Return line connection

- The lubricant quantities which cannot be dispensed by the metering device must be returned to the pump via the return line connection (Fig. 19).

### Control Unit



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Fig. 20 Printed circuit board integrated in the housing



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#### NOTE

*The present Technical Description describes the "Pump model 203 without control unit". Information concerning the design and operation of the individual control units can be found in the respective Technical Descriptions.*

- If the pump is to be equipped with a control unit, it is possible to use an integrated printed circuit board or an external control unit.

## Mode of Operation, continuation

### Low Level Control (optional)

#### For grease

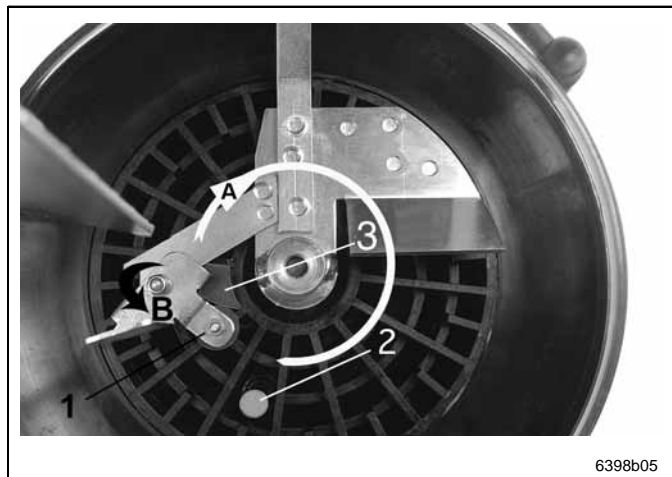


Fig. 21 Switching parts of the low-level control (reservoir filled)

- |                                       |   |
|---------------------------------------|---|
| 1 - Guiding plate with round solenoid | A - Inner orbit of the round solenoid       |
| 2 - Electromagnetic switch            | B - Position of the guiding plate (entered) |
| 3 - Control cam                       |   |

#### Reservoir filled

- The stirring paddle rotates **clockwise** during the lubricating time.
- The entry of the stirring paddle (B) into the lubricant presses the pivoted guiding plate with the round solenoid (pos. 1) inwards to orbit A.
- The solenoid switch (pos. 2) **cannot** be activated contact-free.
- Control cam item 3 guides the round solenoid with the pivoting guiding plate automatically outwards, in the direction of the reservoir wall. When leaving the control cam, the lubricant presses against the guiding plate and moves the solenoid inwards again (B).



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#### NOTE

*The switch parts of the low-level control (items 1 to 3) cannot be used with fluid greases (see fig. 24, page 19).*

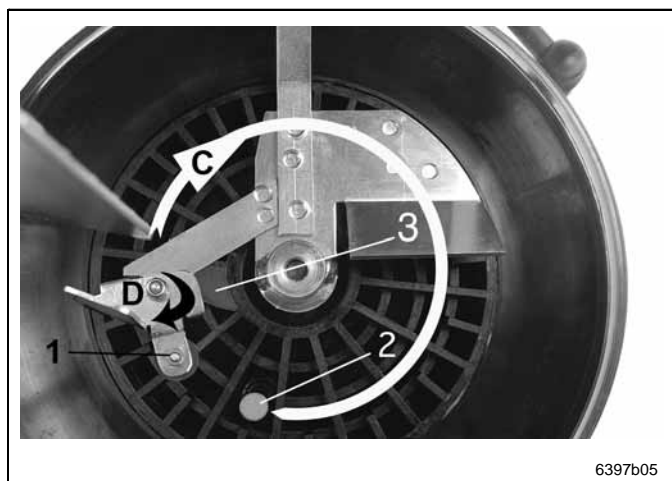


Fig. 22 Switching parts of the low-level control (reservoir empty)

- |                                       |   |
|---------------------------------------|---|
| 1 - Guiding plate with round solenoid | C - Outside orbit of the round solenoid       |
| 2 - Electromagnetic switch            | B - Position of the guiding plate (unentered) |
| 3 - Control cam                       |   |

#### When the reservoir is empty

- When passing the control cam (pos. 3) the solenoid remains in the outer orbit (C) and thereby passes the solenoid switch (pos. 2). The solenoid activates the solenoid switch contact-free and so initiates a low-level indication.
- When the stirring paddle rotates on the outer orbit (C) there is no counterpressure by lubricant.
- The guiding plate with the round solenoid (1) remains unentered (D).

## Mode of Operation, continuation

### Electromagnetic switch

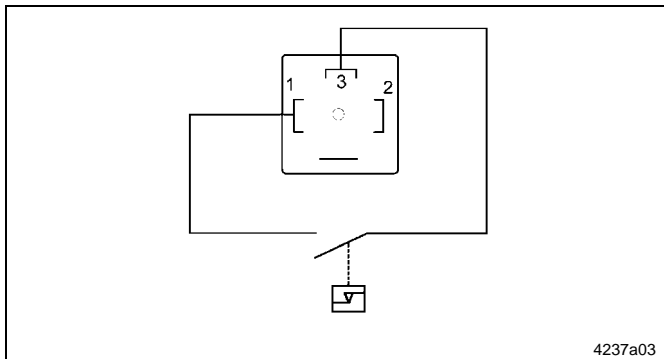


Fig. 23 Connection diagram without control unit, low-level control (optional) for grease

- The electromagnetic switch is activated free of wear and free of contact by means of the magnetic field of the solenoids on stirring paddle.

#### Technical data

Maximum switching capacity ..... 60VA  
Maximum switching voltage ..... 230 V  
Current switched ..... 3 A



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#### NOTE

*The life of the float magnetic / magnetic circuit breaker strongly depends on the conditions under which it is loaded. Since the data relative to the maximum switching capacity refer to strictly resistive loads, which cannot be always guaranteed in practice, it is necessary to take the corresponding contact protection measures in the case of deviating loads.*

### for oil: Float magnetic switch

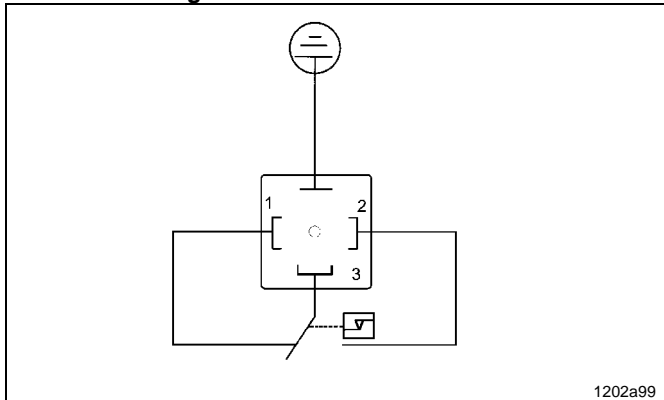


Fig. 24 Connection diagram, low-level control for oil

#### Operating mode

Float magnetic switches are equipped with hermetically sealed reed contacts. The reed contacts are activated by the magnetic field of a ring solenoid included in the float totally free of wear and without contact. The only movable component of the float magnetic switch is the float that moves up and down with the liquid reliably on the slide tube.

#### Technical data

Maximum switching capacity ..... 60VA  
Maximum switching voltage ..... 230 V  
Current switched ..... 1 A

### Contact protection measures

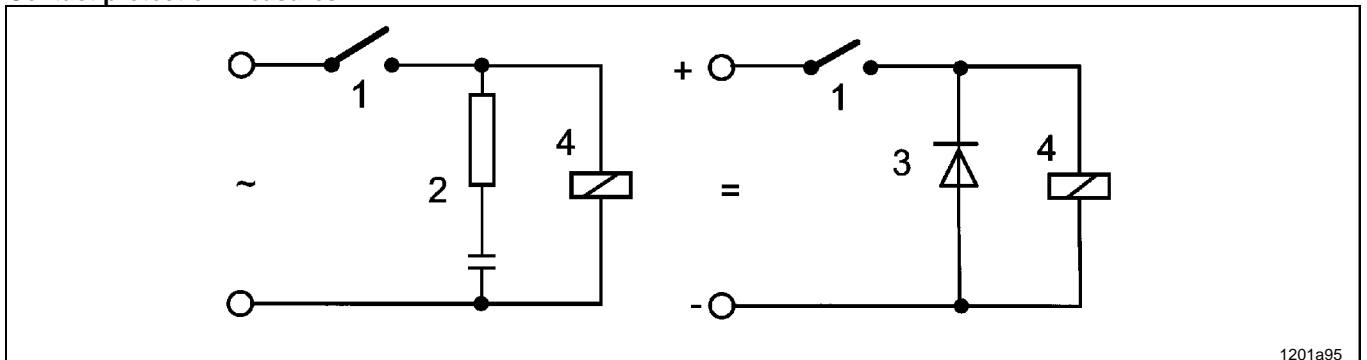


Fig. 25 Contact protection measures

- 1 - Electromagnetic switch
- 2 - RC element
- 3 - Diode
- 4 - Load

## Maintenance, Repair and Tests

### Maintenance

- The maintenance is essentially limited to refilling the reservoir with clean lubricant in good time. However, check regularly whether the lubricant is really dispensed to all the lubrication points.
- Also check the main lines and lubricant feed lines for damage and replace them, if necessary.



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#### NOTE

*Whenever work is done on the centralized lubrication system, particular attention should be paid to absolute cleanliness. Dirt in the system will cause problems.*

- For cleaning the system use benzine or petroleum. Do not use tri-, perchloroethylene or similar solvents. Also do not use polar organic solvents such as alcohol, methylacohol, acetone or similar.

### Pump Filling



6347b04

Fig. 26 Fill pump reservoir



6593b06

Fig. 27 Manual bottom filling of pump reservoir

#### 2 l, 4 l, 8 l - reservoirs

Fill the reservoir up to the "Max." mark via the filling nipple (see Fig. 26), via the filling fitting for cartridges (see Fig. 27) if any, or via the upper filling opening.

It is possible to use greases up to penetration class NLGI 2 or mineral oils of at least 40 mm<sup>2</sup>/s (cST).



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#### IMPORTANT

*The grease or oil must be free from impurities and must not be liable to change its consistency in the course of time.*



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#### CAUTION!

*Danger of squeezing in case of pumps to be filled from the reservoir top:  
**Never put your hand into the open reservoir while pump is running!***



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#### CAUTION!

***Risk of bursting if the reservoir is overfilled.***

*When filling the reservoir by means of pumps with a large delivery volume, do not exceed the max. filling mark.*



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#### NOTE

*If the reservoir has been completely emptied, the pump may require up to 10 minutes before it operates at full output.*

### Repair

#### Pump

- Use only original Lincoln spare parts for repair on the pumps.
- The pump should be returned to the factory for warranty work or major repairs.

## Maintenance, Repair and Tests, continuation

### Repair, continuation

#### Replace pump element

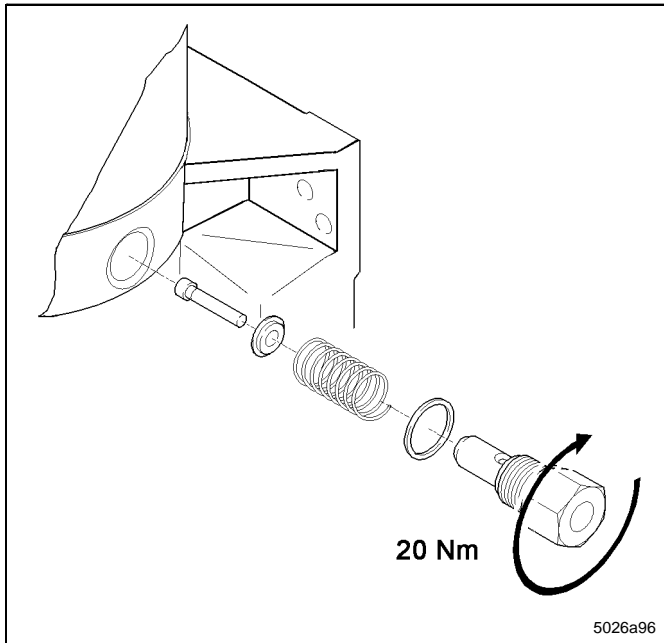


Fig. 28 Replacing the pump element

- Remove the pressure relief valve from the pump element
- Unscrew the pump element. Take care that the piston, the pull-back spring and the washer are not left lying in the grease, otherwise the reservoir must be disassembled in order to remove these pieces



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#### IMPORTANT

*Do not leave the piston, spring and washer in the housing because they may block the motor.*

- Install a new pump element and a new sealing ring.



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#### NOTE

*Pump element with adjustable lubricant output is set to the same output as the old pump element.*

### Tests

#### Operational Test / Triggering an Additional Lubrication Cycle

- To check the pump operation it is possible to perform an additional test. Refer to the Technical Description of the respective printed circuit board.

#### To Check the Pressure Relief Valve

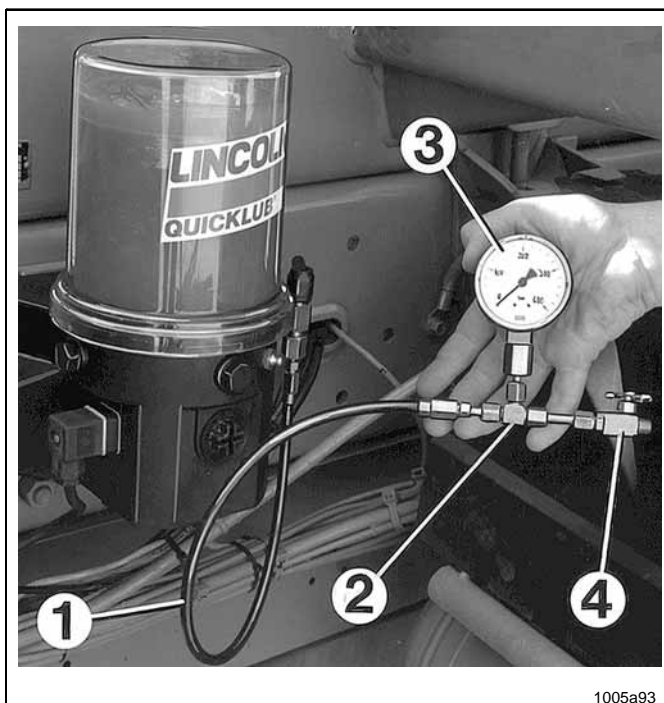


Fig. 29 To check the pressure relief valve

#### 1st option

- Connect the pressure gauge (0-600 bar; 0-8708 psi) to the pressure relief valve (Fig. 16, page 16).
- Trigger an additional lubrication cycle.

#### 2nd option

- Connect the manual pump of the pressure and checking set 604-36879-1 to the pressure relief valve and check the opening pressure by means of the manual pump.
- The pressure relief valve should open at a pressure of 200, 270 or 350 bar depending on its design.



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#### IMPORTANT

*Do not connect the pressure gauge directly to the pump element. High pressure may exceed the above mentioned range, causing the motor to stall. The motor is designed in such a way that it can stall for about 30 minutes without being damaged.*

- 1 - Hose line, min.length 1m
- 2 - T-piece
- 3 - Pressure gauge
- 4 - Relief cock



## Troubleshooting



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### NOTE

*The pump operation can be checked from the outside by observing whether the stirring paddle is rotating (e.g. by triggering an additional lubrication).*

*For troubleshooting in the case of pumps with integrated control units, please refer to the respective **Technical Description** of the printed circuit board.*

### Fault: The pump motor does not run

#### Cause :

- Power supply interrupted
- Electric motor defective

#### Remedy:

- ➔ Check the power supply and fuses. If necessary rectify the fault and/or replace the fuses.
- ➔ Check the line leading from the fuses to the pump plug.
- ➔ Check the power supply to the motor. If necessary, replace the motor.

### Fault: The pump does not deliver the lubricant

#### Cause :

- Reservoir empty
- Air bubbles in the lubricant

#### Remedy:



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### NOTE

*If a lubricant low-level is available, the low level is indicated by the flashing light of the signal lamp in the case of pumps without printed circuit board. The flashing frequency depends on the speed of the motor.*

- ➔ Fill up the reservoir with clean grease or oil. Allow pump to run (trigger an additional lube cycle) until the lubricant issues from all the lubrication points.



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### NOTE

*Depending on the ambient temperature and/or sort of lubricant it may take 10 minutes of operation before the pump elements reach their full lubricant output.*

- ➔ Trigger an additional lubrication cycle. Loosen the outlet fitting or the main line at the pressure relief valve. The lubricant must issue without air bubbles.



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### NOTE

*When push-in type fittings are used, the high-pressure hose which is under pressure cannot be easily disconnected from the pressure relief valve. For this purpose, loosen the pressure relief valve. For this purpose, filling nipple on the pressure relief valve in order to relieve the high-pressure hose.*

- Unsuitable lubricant has been used
- Suction hole of the pump element clogged
- Pump piston worn
- Check valve in the pump element defective or clogged.

- ➔ Renew the lubricant. See the Lubricant List (see page 33 and 34).
- ➔ Remove the pump element. Check the suction hole for foreign particles. If there are any, remove them.
- ➔ Replace the pump element.
- ➔ Replace the pump element.

## Technical Data

### Pump

Admissible operating temperature ..... -25° C to 70° C <sup>1)</sup>  
 Number of outlets ..... 1, 2 or 3  
 Reservoir capacity ..... 2 l, 4 l, 8 l  
 Refilling ..... via hydraulic lubrication fitting or from top  
 Lubricant ..... greases up to NLGI grade 2  
 & ..... mineral oils of at least 40mm<sup>2</sup>/s (cST) at 40° C  
 Class of protection ..... IP6K 9K acc. to DIN 40050 T9



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#### <sup>1)</sup> NOTE

*The pump is designed for the above mentioned temperature range. The lubricants used must still be pumpable at the temperatures mentioned above. In case of doubt, consult the lubricant manufacturer.*

### NOTE

*The pump reservoirs are factory-primed with lubrication grease Renocal FN745 and EP additives make Fuchs. This composition is compatible to most of the commercial greases and helps to prevent faults. If requested by the customer, the pumps can either be primed with another type of lubrication grease or be supplied without priming.*

### Motor

DC gear motor (interference-suppressed)  
 - Operating voltage ..... 12VDC or 24VDC  
 - Max. current input  
 12V ..... 6.5 A  
 24V ..... 3 A  
 Speed ..... approx. 17 rpm  
 Noise emission ..... < 70 dB(A)

### Pump element with fixed lubricant output

Piston diameter, K5 ..... 5 mm  
 - Lubricant output ..... approx. 2 cm<sup>3</sup>/min  
 Piston diameter, (standard) K6 ..... 6 mm  
 - Lubricant output ..... approx. 2.8 cm<sup>3</sup>/min  
 Piston diameter, K7, C7, S7 <sup>3)</sup> ..... 7 mm  
 - Lubricant output ..... approx. 4 cm<sup>3</sup>/min  
 Max. operating pressure ..... 350 bar  
 Connection thread ..... G 1/4

- suitable for tube DIA ..... 6 mm  
<sup>2)</sup> suitable for chisel paste; contact the manufacturer of the lubrication system

<sup>3)</sup> suitable for lubricants containing silicone

### Pump element with adjustable lubricant output

KR ..... 0.04 to 0.18 cm<sup>3</sup>/stroke  
 ..... 0.7 to 3 cm<sup>3</sup>/min  
 Connection thread ..... G 1/4 in.  
 - suitable for tube DIA ..... 6 mm  
 - suitable for tube DIA ..... 8 mm



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#### IMPORTANT

*The lubricant output listed refers to grease of NLGI grade 2 measured at 20°C, backpressure 100 bar, nominal voltage 12/24 V. Any differing pressures or temperatures result in different lubricant outputs. Any system design must be based on the above values.*

### Pressure relief valve

SVETVT-350-G 1/4A-D6 ..... 624-28894-1  
 SVETVT-350-G 1/4A-D8 ..... 624-28774-1

### Torsion torques

Install pump ..... 18 Nm  
 Electric motor on housing ..... 12 Nm  
 Pump element in housing ..... 20 Nm  
 Closure plug in housing ..... 12 Nm  
 Return line connector in housing ..... 10 - 12 Nm

### Weights

The weights below include the following "individual weights":

- Pump kit with **one** pump element, pressure relief valve, grease filling (0.75 kg, 1.5 kg)
- Packing (cardboard box)
- Attaching parts
- Operating Instructions

### 2 l reservoir, standard design (0.75 kg)

- Pump 203 without connection cable ..... 5.4 kg  
 - Pump 203, version E 1 ..... 6.5 kg  
 - Pump 203, version E 2 ..... 7.1 kg

### 4 l reservoir, standard design (1.5 kg)

- Pump 203 without connection cable ..... 8.3 kg  
 - Pump 203, version E 1 ..... 9.3 kg  
 - Pump 203, version E 2 ..... 9.9 kg

### 8 l reservoir, standard design (1.5 kg)

- Pump 203 without connection cable ..... 8.6 kg  
 - Pump 203, version 1A1 ..... 9.6 kg  
 - Pump 203, version 2A1 ..... 10.2 kg

In the case of pump versions deviating from those mentioned, add the weights of the following components to the mentioned weights:

- Per pump element ..... +0.2 kg
- Per pressure relief valve ..... +0.1 kg
- 10 m monitoring cable, 5-wire (microprocessor) E 4 ..... +1.1 kg
- 10 m monitoring cable, 4-wire (microprocessor) E 4 ..... +0.4 kg
- Connection cable with piston detector ..... +0.1 kg
- Reservoir version "Filling from top" (only 2 l) <sup>3)</sup> ... +0.15 kg
- 2 l flat-type reservoir ..... +0.5 kg



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#### <sup>3)</sup> NOTE

*The 4l and 8l reservoirs have the standard design "filling from top".*

Technical Data, continuation

Connection Diagrams

Pumps without control unit

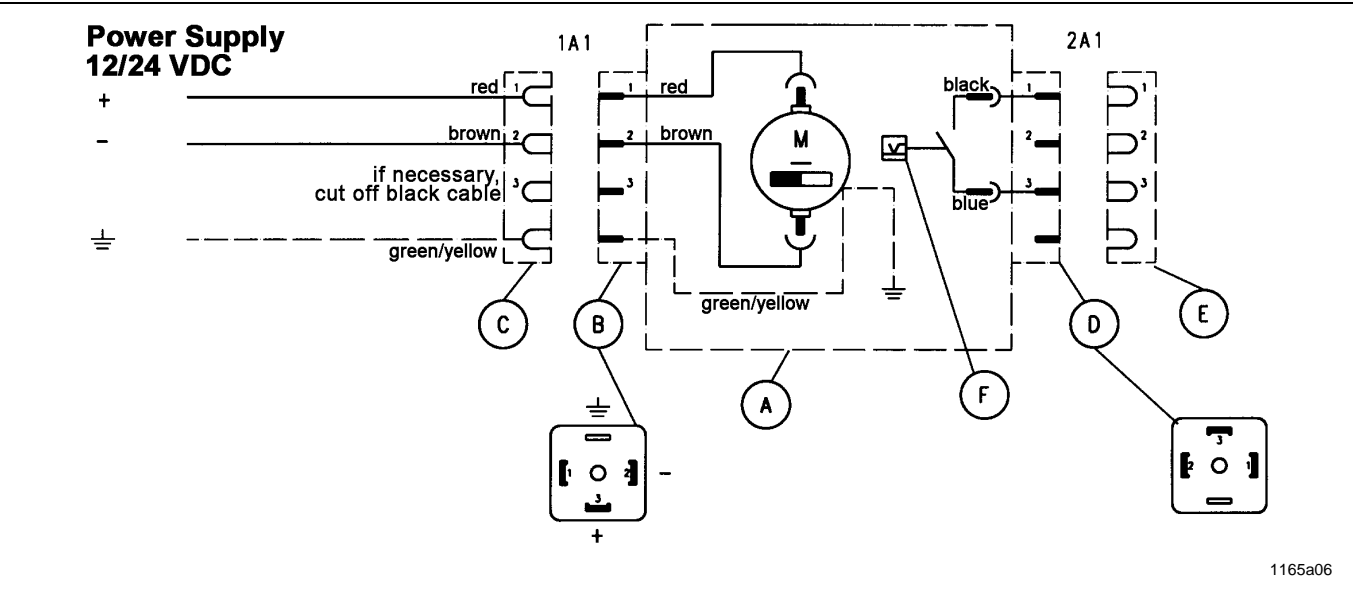


Fig. 30 Connection diagram Quicklub P 203 VDC without control unit, connection: square-type connectors DIN 43650-A

- A - Pump housing
- B - Plug 1
- C - Line socket 1 with connecting cable,
  - 5-core (if necessary, cut off black cable)
  - alternatively: connecting cable from the user
- D - Plug 2<sup>1)</sup>
- E - Line socket 1<sup>1)</sup>
- F - Low-level control
  - Switching capacity max. 60 W/VA
  - Switching voltage max. 230 VAC
  - Switched current max. 1 A
- M - Electric motor

<sup>1)</sup> available with low-level control, only



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NOTE

For further connection diagrams please see the respective Technical Description "Electronic Control Units for Centralized Lubrication Pump Model 203".



## Technical Data, continuation

### Connection Diagrams, continuation

#### Pumps without control unit, continuation

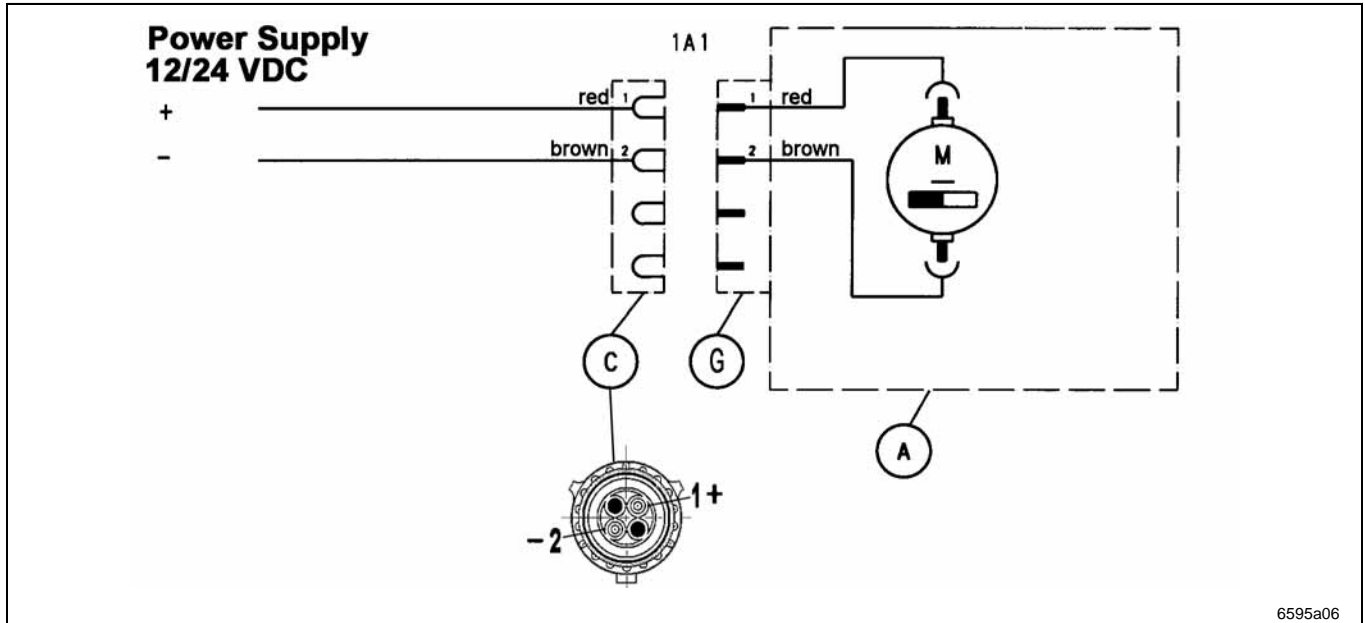


Fig. 31 Connection diagram Quicklub P 203 VDC without control unit, connection: bayonet plug (without low-level control)

A - Pump housing  
B - Plug 1  
C - Line socket 1 with connecting cable, 4/2-core  
M - Electric motor

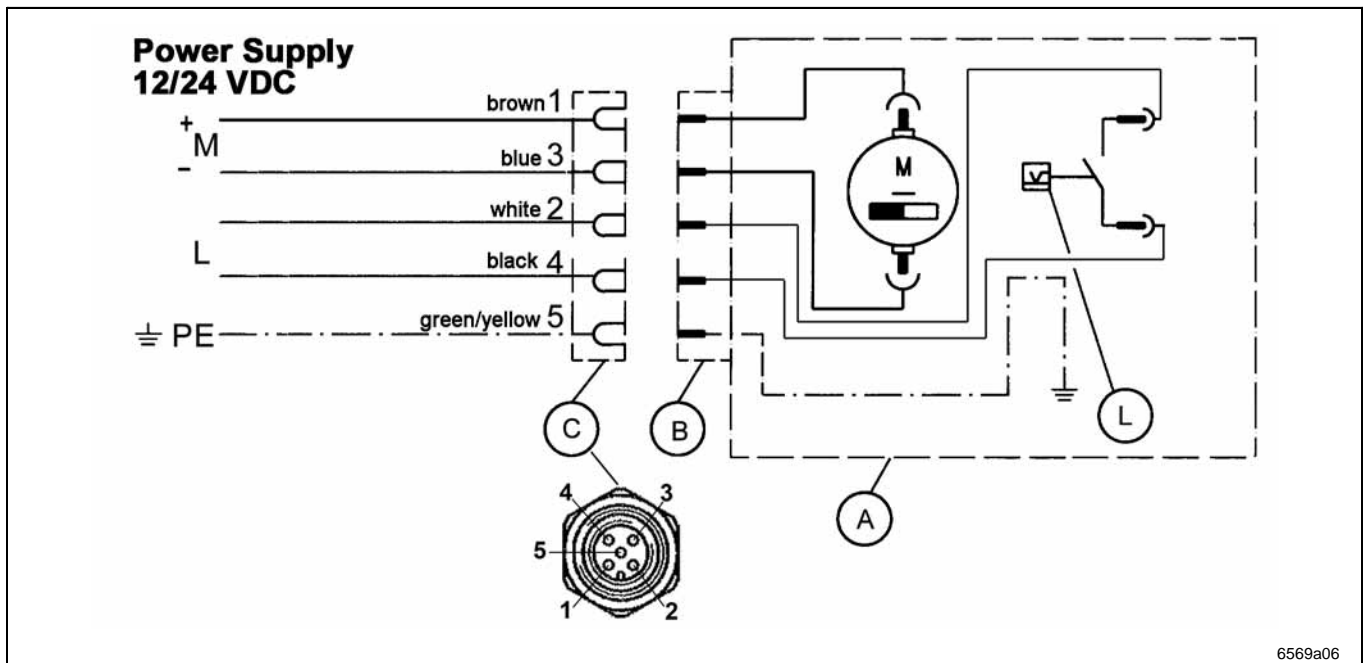
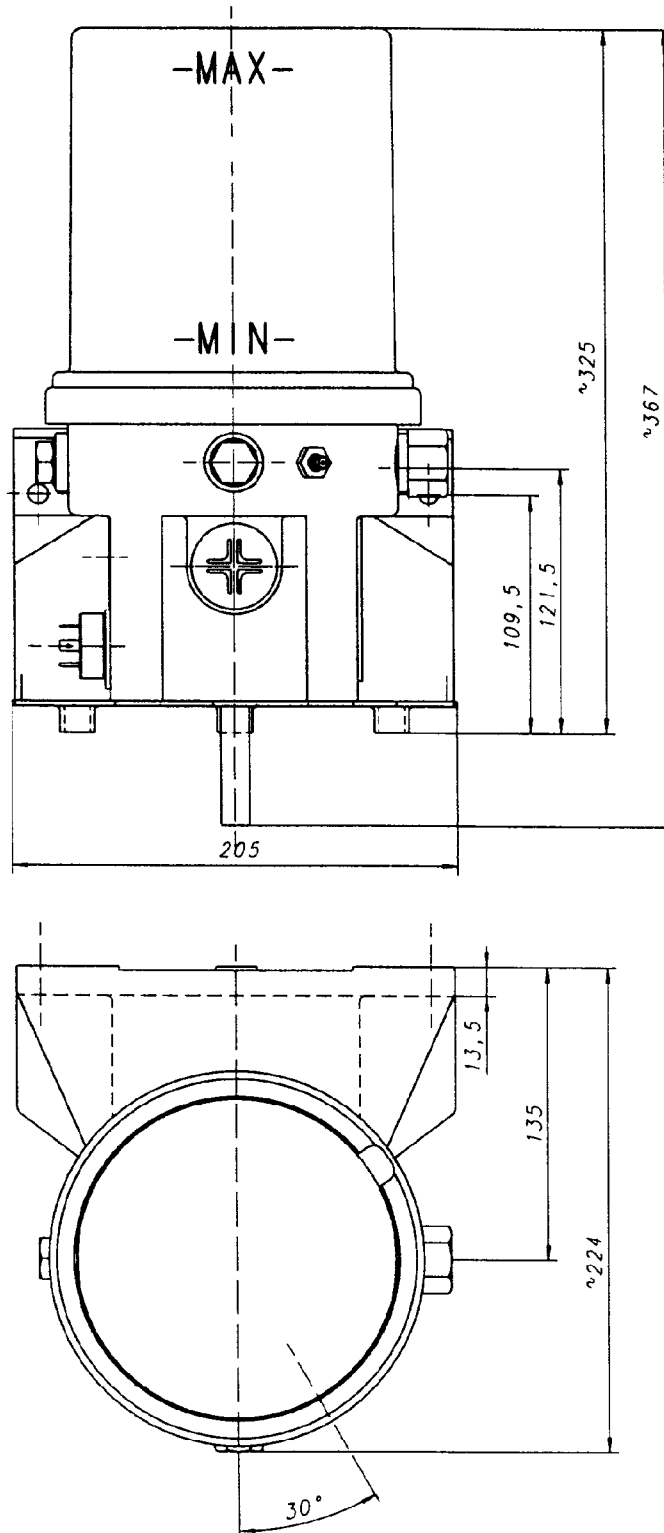


Fig. 32 Connection diagram Quicklub P 203 VDC without control unit, connection: M12 plug

A - Pump housing  
B - Plug  
C - Line socket 1 with connecting cable, 5-core (1-5)  
- alternatively: connecting cable from the user  
1 - brown 3 - blue 2 - white 4 - black 5 - green/yellow  
M - Electric motor  
F - Low-level control  
Switching capacity max. 60 W/VA  
Switching voltage max. 230 VAC  
Switched current max. 1 A

## Technical Data, continuation

### Dimensions - 2 l Reservoir

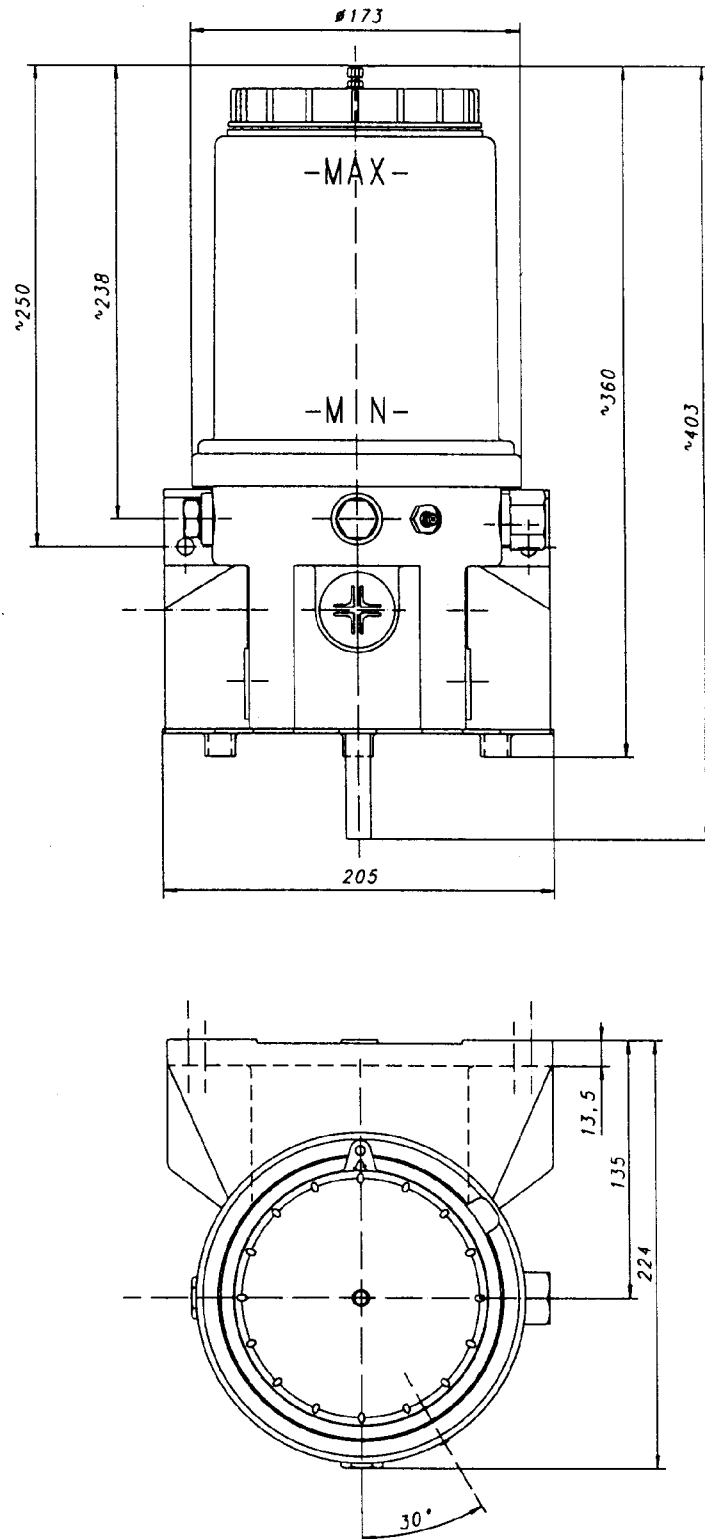


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Fig. 33 Dimensions - 2 l Reservoir

## Technical Data, continuation

### Dimensions - 2 l Reservoir with Filling from Top

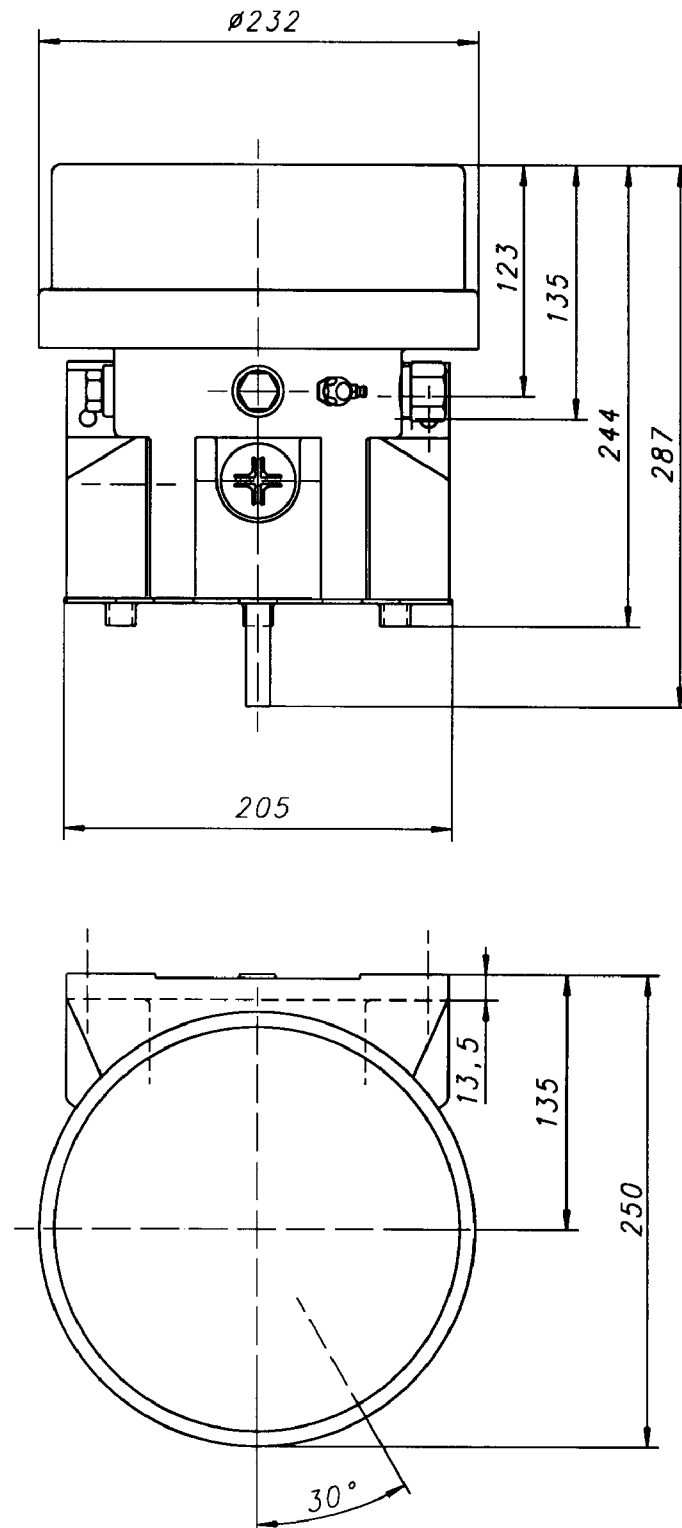


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Fig. 34 Dimensions - 2 l Reservoir with Filling from Top

## Technical Data, continuation

### Dimensions - 2 l Flat-Type Reservoir

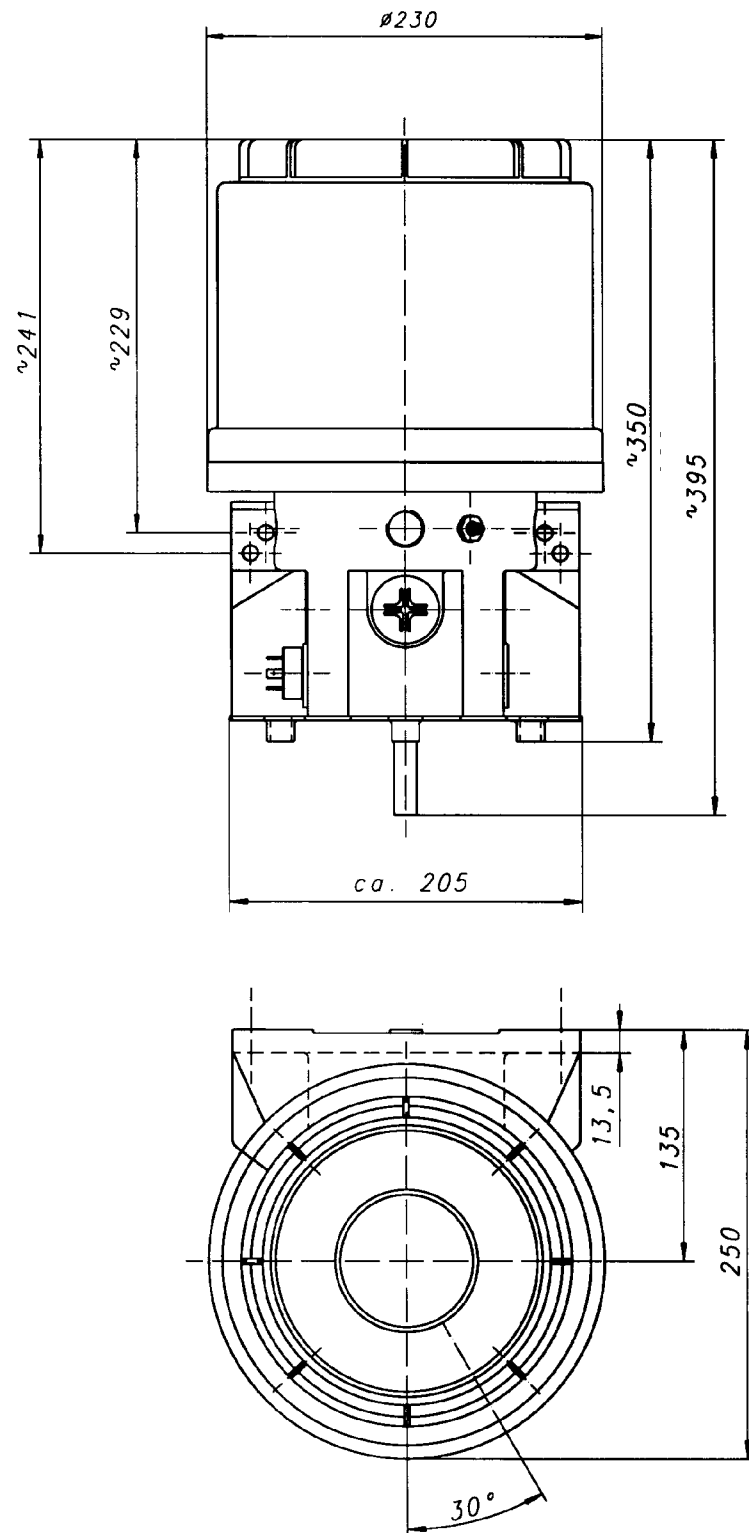


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Fig. 35 Dimensions - 2 l Flat-Type Reservoir

## Technical Data, continuation

### Dimensions - 4 l Reservoir



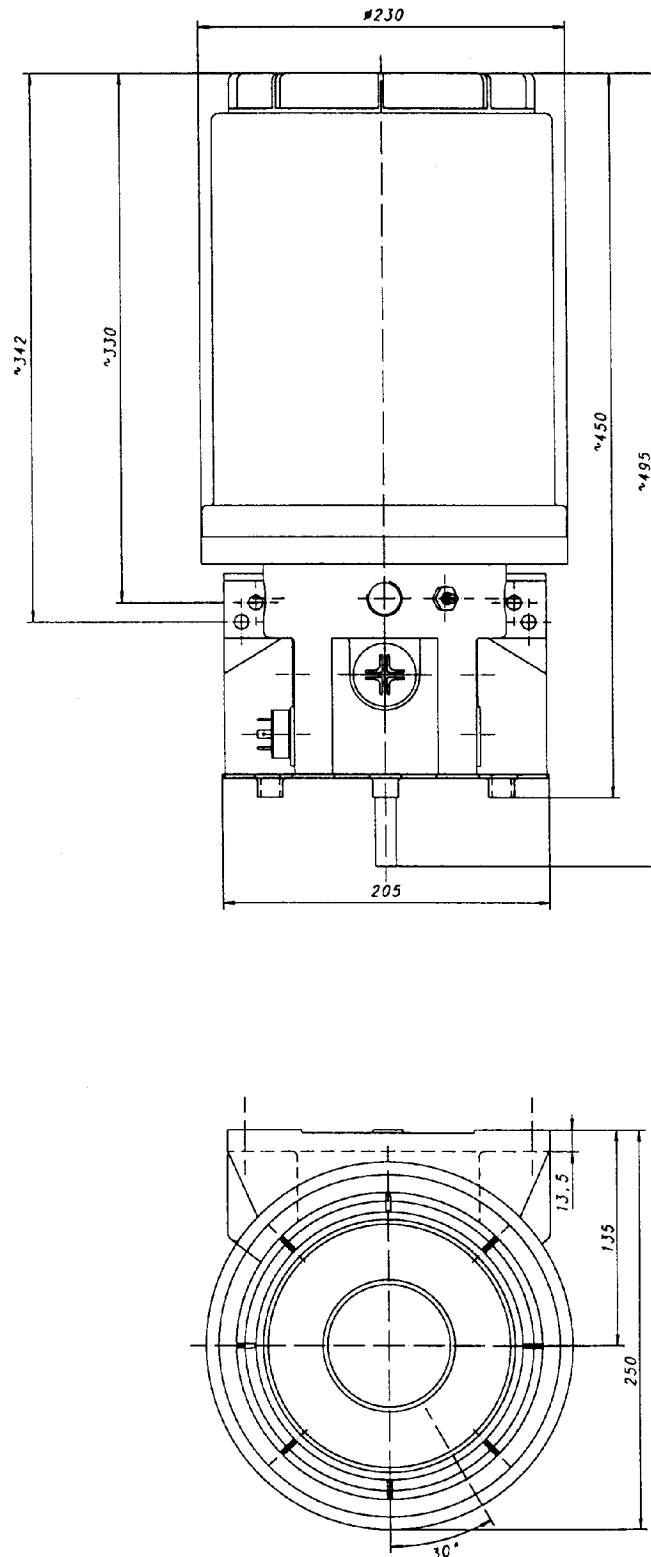
Subject to modifications

Fig. 36 Dimensions - 4 l Reservoir

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## Technical Data, continuation

### Dimensions - 8 l Reservoir



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Fig. 37 Dimensions - 8 l Reservoir

## Technical Data, continuation

### Attaching Boreholes of the 2 l, 4 l, 8 l Pump

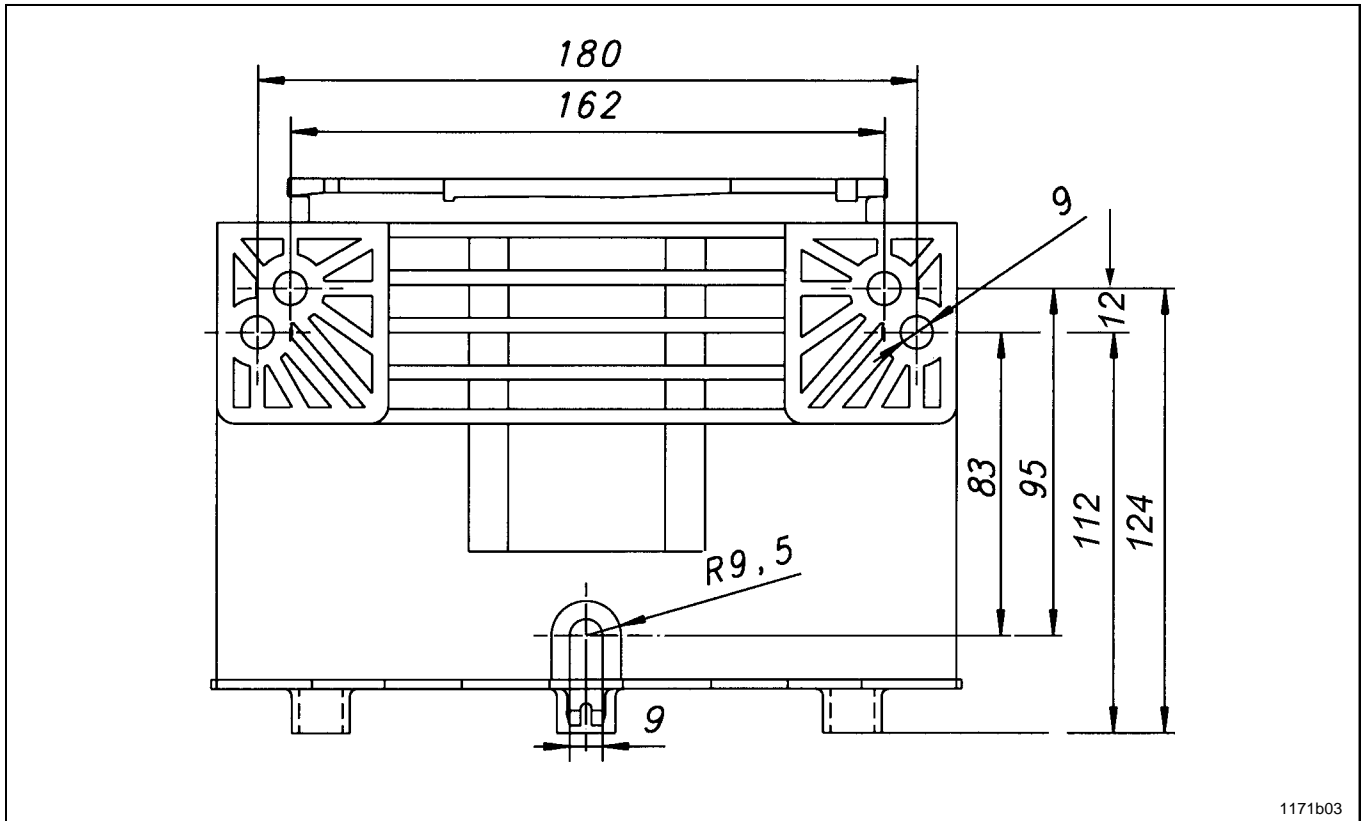


Fig. 38 Attaching Boreholes of the 2 l, 4 l, 8 l Pump



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#### NOTE

*Tighten pump models with 2 L - Flat, 4 L - and 8 L reservoir with three fastening screws ( see pt. 9,5).*

## Lubricants



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### IMPORTANT

*Absolute cleanness is essential when handling lubricants. Impurities will remain suspended in the lubricant and cannot settle. This will result in damage to the lubrication system and thus to the bearing.*

The Quicklub pump can dispense commercial greases up to NLGI grade 2 or mineral oils of at least 40 mm<sup>2</sup>/s (cST) at operating temperature.

The **proven lubricants** (see following tables) have been tested by us with regard to their transportability and bleeding behavior. We can recommend them for an application up to the indicated **minimum delivery temperature** in Quicklub lubrication systems by Lincoln & Co. KG. During the tests these lubricants did not cause any damage due to incompatibility with the material used by us. The composition of the lubricants, their behavior during the transport and their compatibility with other material are not known to us.

**The lubricants we recommend** on the basis of the manufacturer's data sheet (see following tables) can be used in our lubrication systems up to the indicated **minimum delivery temperature**.

Lubricant recipes may change. In case of doubt, send your request for more information to the manufacturer of the centralized lubrication system. This refers in particular to lubricants with more than 3% graphite that are transportable in lubrication systems only conditionally.

The lubricants released by us have not been tested with regard to their long-term behavior.



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### IMPORTANT

*The manufacturer of the centralized lubrication system can accept no liability for:*

- *damages due to the use of greases that are not or only conditionally transportable in centralized lubrication systems.*
- *damages on parts of the centralized lubrication system caused by chemical or biological changes of the lubricant used.*
- *damages due to the incompatibility with other materials.*

*The liability is limited to transportable lubricants in centralized lubrication systems.*



## Lubricants, continuation

### Quicklub List of Lubricants



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#### IMPORTANT

*Use lubricants with solid matter additives only after having consulted the manufacturer of the system!*

#### Proven lubricants

Manufacturer	Designation	Base soap	Min. delivery temperature
AGIP AUTOL	Universal grease	Li-12-OH-stearat	-15 °C
ARAL	Long-term grease H	Li-12-OH-stearat	-15 °C
AUTOL	Top 2000	Ca-complex	-10 °C
AUTOL	Top 2000 W	Ca-complex	-20 °C
BP	C1 Multipurpose grease	Ca	-20 °C
BOSCH-REXROTH	Dynalub 510	Li	-15 °C
BOSCH-REXROTH	Dynalub 520	Li	-20 °C
ELKALUB	GLS 135/N2	Li	-15 °C
FUCHS-LUBRITECH	Stabil Eco EP2	Li/Ca	-25 °C
FUCHS	Renocal FN 745	Ca-12-OH-stearat	-25 °C
FUCHS	Renocal FN3	Ca	-20 °C
FUCHS	Renolit LZR 2 H	Li	-20 °C
FUCHS	Renolit HLT 2	Li	-25 °C
MOBIL	Mobilith SHC 100	Li-complex	-25 °C
MOLYKOTE	TTF 52	inorganic thickener	-30 °C
OPTIMOL	Longtime PD 2	Li-12-OH-stearat	-20 °C
OPTIMOL	Olit CLS	Li/Ca	-15 °C
RHENUS	Norlith KSP 2	Li + Li-12-OH stearat	-15 °C
RHENUS	Norlith MZN 2	Li	-15 °C
SHELL	Retinax EPL 2	Li-12-OH-stearat	-10 °C
SHELL	Retinax CSZ	Li/Ca	-35 °C
WESTFALEN	Gresalit ZSA 2	Li-12-OH-stearat	-15 °C

#### Lubricant recommendations based on the manufacturer's data sheet

Manufacturer	Designation	Base soap	Min. delivery temperature
AGIP	F1 Grease 24	Ca	-15 °C
ARAL	Multipurpose grease	Li-12-OH-stearat	-15 °C
ARAL	Multipurpose grease ZS 1/2	Li/Ca	-20 °C
AVIA	Avialith 2 EP	Li-12-OH-stearat	-15 °C
BP	Energ grease LC 2	Li-complex	-15 to -10 °C
BP	Energ grease MP-MG 2	Ca-complex	-5 °C
CASTROL / TRIBOL	Molub Alloy 6780	Li-12-OH-stearat	-30 to -25 °C
CASTROL	CLS - Grease	Li/Ca	-25 °C
CASTROL	Olista Longtime 2	Li	-20 °C
CASTROL	Optimol Olit 2 EP	Li	-20 °C
DEA	Glissando 20	Li-12-OH-stearat	-15 to -10 °C
ESSO	Ronex Extra Duty 2	Li-complex	5 °C
ESSO	Ronex MP2	Li-complex	-5 °C
ESSO	Beacon EP2	Li	-5 °C
ESSO	Cazar K2	Ca	-15 °C
FIAT LUBRIFICANTI	Comar 2	Li	-25 °C
KLÜBER	Centoplex 1 DL	Li/Ca	-20 °C
KLÜBER	Isoflex NBU 15	Ba	-25 °C
KLÜBER	Klüberplex BEM 34-132	Ca-complex	-20 °C
KLUEBER	Klüberplex BEM 41-141	Li-complex	-25 °C
KLÜBER	Petamo GHY 133 N	Polycarbamide	-15 °C
MOBIL	Mobilgrease XHP 221	Li-complex	-10 °C
MOBIL	Mobilgrease XHP 461	Li-complex	-10 °C
MOBIL	Mobilgrease XHP 222	Li-complex	-5 °C
MOBIL	Mobilith SHC 220	Li-complex	-20 °C
SHELL	Alvania EP(LF) 1	Li-12-OH-stearat	-15°C +/- 5°C
SHELL	Alvania EP(LF) 2	Li-12-OH-stearat	-10°C +/- 5°C
SHELL	Alvania RL2	Li-12-OH-stearat	-15°C +/- 5°C
SHELL	Malleus GL	Gel	GL205 -20 °C, GL300 -10 °C
SHELL	Retinax CS	Li	-20 °C
SHELL	Retinax LX 2	Li	-5°C +/- 5°C
SHELL	Retinax HDX 2	Li/Ca	-10°C +/- 5°C
TEXACO	Premium RB	Li	-20 °C
TOTAL	Ceran AD	Ca-complex	-15 °C
TOTAL	Ceran LT	Ca-complex	-20 °C
TOTAL	Ceran WR2	Ca-complex	-10 °C
ZELLER & GMELIN	Divinol Lithogrease G 421	Li-complex	-15 °C

Subject to modifications

## Lubricants, continuation

### Quicklub List of Lubricants, continuation



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#### IMPORTANT

*Use lubricants with solid matter additives only after having consulted the manufacturer of the system!*

#### Biodegradable lubricants

Proven lubricants:

Manufacturer	Designation	Base soap	min. delivery temperature
ARAL	Aralub BAB EP 2	Li/Ca	-25 °C
BP	Biogrease EP 2	Li/Ca	-25 °C
FUCHS-LUBRITECH	Stabyl ECO EP 2	Li/Ca	-25 °C

Lubricant recommendations based on the manufacturer's data sheet:

Manufacturer	Designation	Base soap	min. delivery temperature
AUTOL	Top Bio 2000	Ca	-25 °C
AVIA	Biogrease 1	Li	up to 0 °C
DEA	Dolon E 2	Li	-15 °C
FUCHS	Plantogel 2 S	Li/Ca	-15 °C
KLÜBER	Klüberbio M72-82	Polycarbamide	-20 °C

#### Lubricants for the food & beverage industry

Lubricant recommendations based on the manufacturer's data sheet:

Manufacturer	Designation	Base soap	min. delivery temperature
ARAL EURAL	Grease EPF 2	Al-complex	-5°C
BREMER & LEGUIL	Rivolta F.L.G 4 – 2	Al-complex	-20 °C
ELKALUB	GLS 364	organic thickener	-10 °C
ELKALUB	GLS 367/N2	inorganic thickener	-5°C
ELKALUB	GLS 380/N1	Al-complex	-10 °C
ELKALUB	GLS 380/N2	Al-complex	-5°C
FUCHS	Renolit G 7 FG 1	Bentonite	-5°C
FUCHS-LUBRITECH	Gleitmo 585 M (KTW-drinking water release)	Li	-10 °C
INTERFLON	Fin Food Grease EP	Al-complex	-5°C
KLUEBER	Paraliq GA 343	Al-complex	-10 °C
KLUEBER	Kluebersynth UH1 14-151	Al-complex	-20 °C
MOBIL	Mobilgrease FM 462	Al-complex	-15 °C
Nordischer Maschinenbau	Special grease GLS 380/N3	Al-complex	-5°C
OKS	470	Li-12-OH-stearat	-15 °C
OPTIMOL	Obeen UF 1	Al-complex	-15 °C
OPTIMOL	Obeen UF 2	Al-complex	-10 °C
RHENUS NORPLEX	AFD 2	Al-complex	-5°C
RHENUS NORPLEX	AFP 2	Al-complex	-5°C
RHENUS NORPLEX	AFS 2	Al-complex	-25 °C
RHENUS NORPLEX	AFW 2	Al-complex	-5°C
SHELL	Cassida Grease EPS 1	Al-complex	-15 °C
SHELL	Cassida Grease EPS 2	Al-complex	-10 °C
TOTAL	Lubriplate FGL 2	Al-complex	-5°C
TRIBOL MOLUB-ALLOY	FoodProof 823-2 FM	Al-complex	-15 °C
TRIBOL MOLUB-ALLOY	9830 high-temperature grease	PTFE	0°C

**Note:**

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